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Industrial Fuel Business that is Readily Available to Any Gas Company

Lard Rendering Equipment for Individual Butcher Shops an Especially Saleable Product—Wide Variety of Uses of Cauldron Furnaces

By GILBERT C. SHADWELL
Sales Manager, Improved Appliance Company, Brooklyn, N. Y.

The case of many of we gas men in the industrial fuel field is in some respects analogous to the would-be student of English literature. There has been so much that has been written that is good and that should be read that embryo enthusiasm is nipped in the bud and almost destroyed as the neophyte neither knows where to begin nor where to end. The gas man does not know what he should offer to his prospective consumers nor what industries he should seek out. He becomes confused and does not know "where to turn." He probably feels that the industrial business must take a form such as only the Genie of Alladin's lamp could give him.

He must change in an instant from the sale of domestic appliances consuming perhaps three, perhaps fifteen, cubic feet of gas per hour to the installation of something he knows very little about which is going to consume hundreds, thousands, perhaps tens of thousands of cubic feet of gas per hour.

By dint of good salesmanship he may secure an installation; but if he has not studied the subject closely, his achievement may prove a white elephant which will be thrown out after only a few weeks or months of operation. Worse still, it has confirmed at least one doubter in the unwarranted belief that gas is a fancy fuel; very good for publicity purposes, but exceedingly costly. He has reached for the horizon and has lost it.

It is in order to prevent mistakes of such a kind that the writer is presenting in simple language, the elements of the subject; by describing these appliances for which a use may be found in almost any territory.

Simple appliances distributed thoroughly and wisely and properly installed will bring large returns and the experience gained, will, after a comparatively short time bring in well-deserved fruits of success. The idea is to teach the gas man to crawl before he can walk and to walk before he can run.

As there are probably several thousand different styles of industrial appliances in use to-day it is none too easy a matter to decide which should have our first attention as their importance is only relative to the work they have to perform.

The author, after some deliberation, however, has come to the conclusion that as the general classification of cauldron furnaces is so wide and the uses to which they can be put is so great they should claim first place in this discussion.

The modifications of these appliances are, moreover, limitless and some typical adaptations will be given.

Cauldron Furnaces

The essential features of a cauldron furnace are that it should be perfectly adapted to the work it is to perform, and that it should be safe and reasonably efficient. This covers not only cauldron furnaces, but, in fact, every industrial appliance and is of prime importance to the gas man.

The first point of perfect adaptability embodies perfect construction, durability and the like. The second point of safety is self explanatory. The third item of reasonable efficiency should embrace reasonable insulation, proper heat application and appliance design to suit the conditions pertaining in the locality under consideration.

Engineering skill is essential to the proper evolution of any industrial gas-burning appliance and this skill deserves recognition. Two pocket-knives may look much alike and yet one may be worth five times as much as the other, and cauldon furnaces may have the same difference in quality.

These furnaces cover one of the largest fields in industrial fuel, and it is one easy to reach.

Its uses include lard rendering, potato chip cooking, preparation of syrups, meat cooking, blueing manufacture, sausage cooking, dye boiling, wax melting, the manufacture of certain soaps and laundry compounds,

FIG. 1. TYPICAL STANDARD TYPE DIRECT HEATED GAS CAULDRON FURNACE

dyeing cloth and hair, varnish making, shoe blacking, ink manufacture, scalding chickens, boiling lobsters, cooking cattle food, making drugs, face cream, sterilizing bottles, boiling linseed oil, for platers' hot baths, etc.

Some of these processes require direct heat, others require indirect heat. Those which can be performed by direct heat are in the majority. Indirect heating methods cover cauldron furnaces which are water-jacketed, steam jacketed, oil jacketed, sand jacketed, etc. Viewed in another light even jacketed furnaces may be considered as being direct-heated in so far as they may usually be self contained—that is to say the burner, etc., is all contained in the same jacket.

A typical standard type of direct heated gas operated cauldron furnace is shown in Fig. 1. Such a furnace consists of a sheet steel body properly reinforced into which there rests a kettle which may be of black cast iron, galvanized cast iron, enameled cast iron, welded sheet steel, copper, tinned copper or tinned steel according to the use to which the furnace is to be put.

In the case of all cauldron furnaces of good construction, the furnace body, where exposed to the heat, should be well insulated to prevent loss of heat by radiation, to protect the steel from the action of the flame, and to protect the operator from the heat of the furnace and a door

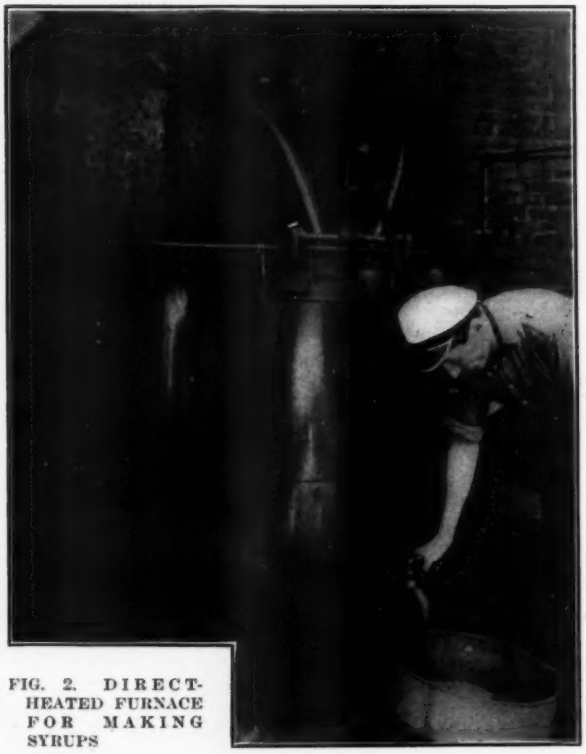


FIG. 2. DIRECT-HEATED FURNACE FOR MAKING SYRUPS

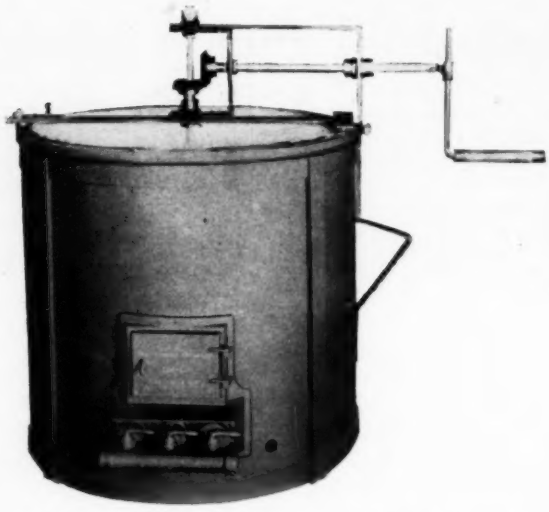


FIG. 3. CAULDRON FURNACE FITTED WITH AGITATOR

of generous size should provide convenient access to the burner which should be situated at the properly calculated distance from the bottom of the kettle, this distance depending on several factors.

A feature found in good gas-fired cauldron furnaces should be some suitable arrangements for utilizing the heat as much as possible. Such an accessory is a flange or baffle which is placed at the flue outlet and which compels the heat of the flame to rise evenly around all sides of the kettle. This not only insures even heating, but it economizes gas on account of the fact that the heated products of combustion are not allowed to pass straight back from the burner to the chimney.

Atmospheric Burners Usually Supplied with Cauldron Furnaces

In special cases other provisions can be made for even greater economy of heat especially where the price of gas is very high and when the price of the furnace is of secondary importance.

In any case, no such details of construction are ever found on coal or similarly-fired furnaces and this consequently renders their efficiency very low.

Points such as these are of great importance to the gas salesman who is handling the best gas appliances.

Atmospheric burners, of the ring type, are usually

FIG. 9. FURNACE WITH PUMP TO CONVEY CONTENTS OF KETTLE TO FLOOR ABOVE

supplied with cauldron furnaces. They should be of sufficient capacity for the most rapid heating. A separate cock should be provided for each ring of the burner so that the heat may be very accurately controlled. The burners should also have brass orifices, so as to be adjustable for either artificial or natural gas. Blast burners are only necessary in special cases.

A shelf placed just beneath the door is an important adjunct. Such a device protects the air-gas mixers from being clogged by drippings. The character of the materials of construction should be such as to make the appliance practically indestructible for all ordinary use.

A flue collar should be provided and a flue connection is to be recommended unless the room is large and well ventilated.

Uses of Direct-Heated Cauldron Furnaces

Many of the uses of direct-heated cauldron furnaces deserve special mention.

The process of syrup making is a particularly simple one. Direct heat is employed as a rule, although a steam jacketed furnace is sometimes used. When great speed is needed blast burners can be substituted for atmospheric ones.

There are only a few kinds of syrup made in a cauldron furnace, namely, chocolate, coffee or other similar syrups. All the rest are made without heat except in rare cases.

Fig. 2 shows a direct-heated cauldron furnace for this purpose. It will be noted that it has a hinged lid and hand operated agitator as well as a bibb cock for emptying the contents when ready.

In making such syrups, water is poured into the kettle which is brought up to about boiling temperature. The requisite amount of sugar is added when the water is warm and when hotter the chocolate or other flavor is also put in. It is then boiled and agitated for just a few minutes and then run off and bottled.

Fig. 3 shows in more exact detail a cauldron furnace fitted with an agitator.

As mentioned above, blast burners are sometimes desirable with such a furnace and it is also of use to fit legs to the furnace for raising the height of the bibb cock outlet (and incidentally of the furnace). Such a cauldron furnace is shown in Fig. 4.

There is an important use for cauldron furnaces which is perhaps as wide as any—namely, in butchers' shops for lard rendering, meat cooking, sausage cooking, scalding chickens, for obtaining plenty of hot water quickly and similar purposes.

The process of rendering lard may be described as follows: Pieces of pork fat are picked over carefully so as to remove any lean meat or in fact any material which does not consist of fat and they are then cut into small pieces.

These pieces are then put into a rendering kettle which is a regular, direct-fired cauldron furnace, with a small amount of water to prevent the fat burning onto the kettle. It is heated slowly until the fat is thoroughly cooked—care being taken not to brown the fat by overcooking.

This fat and cooked cracklings are then dipped into a strainer which removes the cracklings.

The lard should remain in a settling pan until the brown sediment from the cooking settles to the bottom—after this the clear lard is drawn off.

Then the cracklings are put into a press, where the fat is pressed from them, from which it is run into a pan. The lard is then drawn off and placed in a kettle having an agitator and agitated until it possesses a pure

FIG. 4. FURNACE RAISED ON LEGS TO ELEVATE BIBB COCK OUTLET

white flaky appearance. If the whole operation is properly carried out the lard should keep almost indefinitely and be of the very best quality.

hot enough. If it is not cooked enough, its keeping qualities are impaired and if it is cooked too much it means that goods worth at least 18 cents a pound are being boiled away—and a pound is worth more than the amount of gas (at $1.00 per M. cu. ft.) needed to render 150 lb. of fat. In this connection it should be noted that the process of lard rendering in a gas cauldron furnace of good make requires approximately one cubic foot of gas per pound of lard. The 35-gal. size will hold 100 lb. of fat, and the rendering may be finished in 40 to 50 minutes.

So far as the time is concerned, with a uniform gas fire set the same each day, the product will always be the same and the shrinkage will be cut visibly.

Then again it is clean. A man can't make lard and run a coal or wood fire at the same time without dropping some of the litter from his sleeves into the kettle once in a while. Gas means a sanitary shop—all spic and span.

Another factor of evident importance is that a butcher can avoid the loss of selling his fat to the packing houses and can be induced to render his lard if he is shown how easy it is with gas, and how splendid a profit he will make. Anyone can do it.

The same furnace will scald the chickens, cook sausage and work up mutton and other fat into tallow. Surely this business should be easy to obtain.

The few suggestions already made for the users of cauldron furnaces serve to show how enormous this field is and how easy it is to reach. Some further remarks and examples are of value however.

The sizes usually marketed are given in the following table, the nominal size being the usual manufacturers' rating:

Nominal size (gals.)	10	18	25	35	50	65	90	110
Actual capacity (gals.)	9	17	22	29	39	55	80	100
Capacity 2 in. from top	7	14	18	24	33	48	71	89
Capacity 4 in. from top	5	11	14	20	27	41	62	77
Diameter of Kettle	18	21½	25	27	31	33	37	41
Depth of Kettle	12	13½	15	16	18½	20½	22	23
Height of Furnace	31	31	31	31	32½	35	36	38
Diameter of Furnace	21½	25	28	31	35	38½	42½	46
Floor Space:								
Wide	25	28	31	34	38	41	45	48
Deep	28	33	36	38	44	48	50	54
Size Gas Pipe	¾	¾	1	1	1¼	1¼	1½	1½
Gas per hr.	75	90	125	150	300	300	500	500
Shipping Weight	150	185	210	270	400	470	630	800

Many butchers render lard with any fuel whatsoever. They have wood as a natural by-product of their business,—old crates and boxes and refuse material which costs them nothing. Yet such fuel is more expensive than gas, since the labor of preparing it, breaking up, chopping, etc., is greater than the cost of the gas. These customers can be converted to the use of gas as a fuel because it is better and will save money. Every meat shop is not simply a possibility, but *a good prospect*. The reasons are not hard to understand.

Lard renders at 240 deg. Fahr. to be perfect. Too much above or below this temperature spoils it. Proper control of temperature *cannot* be obtained with wood or coal. This is seen by the variation in the lard obtained from day to day—maybe the fire is hotter, perhaps not

As suggested above, variations from the standard type are required for certain purposes. The cast iron kettles may be galvanized, or white porcelain enameled, as conditions require. Or the furnaces can be equipped with kettles made of copper, either bare or tinned. For certain purposes the kettle, of whatever material it is made, must be water-jacketed.

Galvanized iron kettles are employed where the product to be heated would be damaged by iron rust and where this product is not of an acid nature. This applies to soaps and laundry compounds. Galvanized iron kettles are little attacked by alkalies of moderate strength. Galvanized iron is more readily cleaned than is bare cast iron, and it presents a more cleanly appearance which is always to be desired.

Copper Kettles for Quick Heating

Copper kettles are employed where the product to be treated must be heated quickly, and must be protected against the possibility of being discolored either by rust or by any scale which will sometimes accumulate on a cast-iron kettle, even if galvanized. The copper kettle may be readily cleaned and polished, as it has a much more even surface than galvanized iron.

Fruit acids have no effect whatever on polished copper. But the influences of the atmosphere will oxidize and tarnish the copper, and it is then readily attacked by very weak acids. Where the conditions of its use require absolute protection against trouble on this account, the copper kettle should be tinned.

For example, confections made up chiefly of sugar or syrups may be prepared in bare copper, but soda fountain products which contain fruit acids should preferably be prepared in tinned copper kettles. The tin surface is not oxidized by the influences of the atmosphere, and consequently there is no danger of discoloration of the product being heated, even if it is of an acid nature.

A white porcelain enameled iron kettle is not attacked either by acids or alkalies of ordinary strength, and its smooth glazed surface is readily cleaned so that it is at all times free from the least incrustation. Such a surface is used where the product being heated would be ruined by the slightest discoloration. This is the case

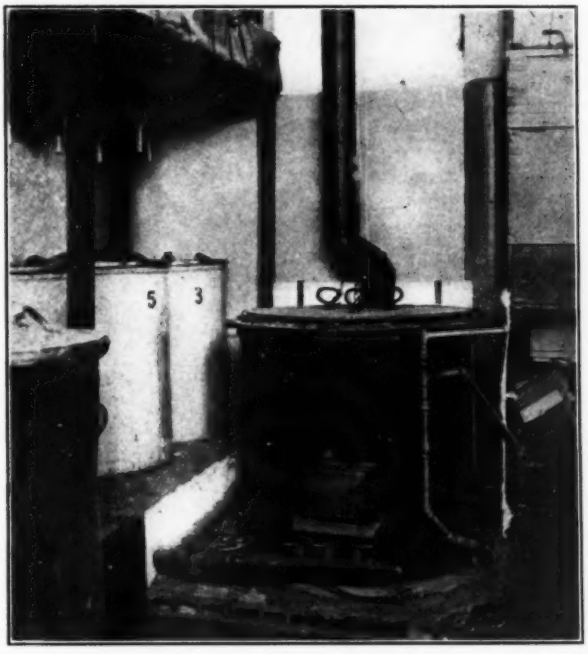


FIG. 5. FURNACE USED FOR MANUFACTURE OF MOUTH LOTIONS AND TOOTH PASTE

with some face creams, and certain fancy soaps and toilet preparations. An enameled iron kettle does not necessarily presuppose the necessity of a water jacket. Some fancy grades of lard are prepared in enameled direct-heated kettles, in which case, of course, no water jacket is used.

Water-Jacketed Cauldron Furnaces

Water-jacketed kettles are employed where extremely low temperatures are required and where the danger of

FIG. 7. FURNACE EQUIPPED WITH EXTRA BURNER FOR HEATING OUTLET

burning must be guarded against. In case the product being treated becomes too hot, the water in the jacket may be run off and replaced with a fresh supply of cold water, thus quickly reducing the temperature. This is an advantage in the preparation of soaps and face creams. Water-jacketed kettles are regularly provided with gauge glasses to indicate the amount of water standing on the jacket. They are equipped with an inlet pipe for filling the jacket, and with an outside drain cock for emptying the jacket.

Other variations of the standard type of furnace are required in many instances to facilitate filling and emptying the kettles, and for agitating the contents of the kettle while being heated.

Fig. 5 is of interest especially as regards the lid. This furnace is used for the manufacture of mouth lotions and tooth paste. It has an enameled water-jacketed kettle and the lid is made of glass so that the contents may not be contaminated, because the product is spoiled if brought into contact with any metal.

Fig. 6 shows a furnace for a similar purpose. The fact that the conditions of manufacture were different, however, necessitated a steam-jacketed furnace (which it will be noted is self contained and needs no steam boiler). This furnace has a molasses gate outlet at the bottom, owing to the fact that face creams are made in the furnace in addition to the regular tooth paste and lotions. The agitator is made for either hand or power drive.

Fig. 7 is a regular cauldron furnace for the manufacture of cold creams. This furnace also has a molasses gate outlet and also a copper cone-shaped lid. In addition it has an extra burner for heating the drain or outlet to facilitate emptying the product.

The manufacture of cold creams varies considerably. In some cases it is analogous to lard cooking and in other cases it is complicated by the use of oils, etc. In soliciting this business, therefore, care should be taken to ob-

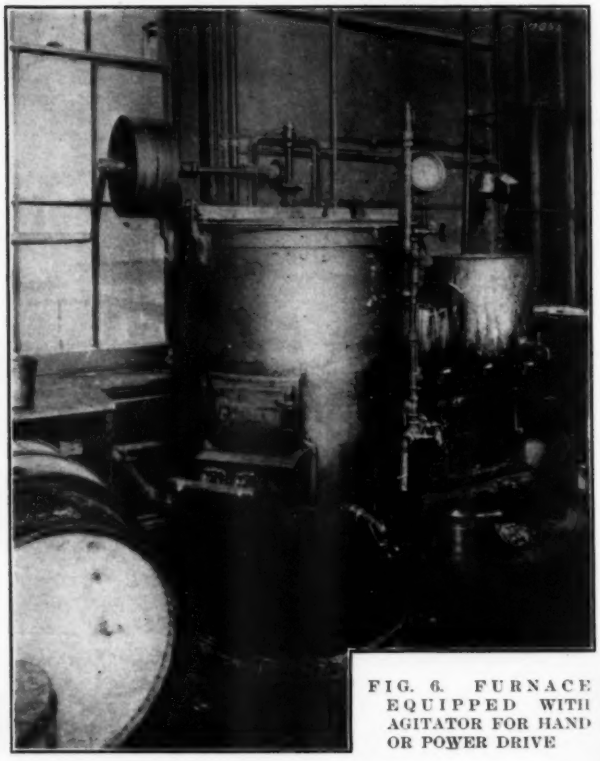


FIG. 6. FURNACE EQUIPPED WITH AGITATOR FOR HAND OR POWER DRIVE

tain details as to the temperatures required as well as all other points of importance.

Fig. 8 shows a special cauldron furnace with copper kettle for the manufacture of celery tonic and sarsaparilla. In this case certain syrups are cooked which are added to charged water and bottled.

At this point a word regarding regular cauldron furnace accessories may be of value.

Legs may be placed under cauldron furnaces so that a pail may be placed beneath the outlet. When legs are attached, the regular height from the floor to the center of the outlet should be about twenty inches. Sometimes the furnace body is extended the necessary amount instead of using legs.

Agitators for cauldron furnaces such as have been mentioned are usually made of cast iron, galvanized iron or aluminum. In the case of aluminum agitators, the shaft is tinned iron, the blades only being made of aluminum. Wood tips or scrapers are also often employed. These agitators may be either hand operated or equipped with pulley for belt drive as required.

Pumps are employed when it is necessary to transport the contents of the kettle for any considerable distance from the furnace, or to a floor above. They are usually made in cast iron or bronze, either hand operated or equipped with pulley for belt drive. Convenient capacities of pumps are 5½ and 10 gal. per minute when driven at 50 r.p.m.

Fig. 9 shows a cauldron furnace equipped with such a pump.

It is usually the best practice to make the outlets on cauldron furnaces pass downward through the burner, and then out through the side of the jacket. This does away in some degree with any danger of burning the product. But if necessary such outlets may be insulated at the point where they pass the burner.

Outlets on water-jacketed cauldron furnaces are the same as on the direct-heating type, except that they are water jacketed where they pass through the burner. This is done to prevent over-heating at this point.

A type of outlet sometimes used is the center valve outlet which consists of a valve placed in the bottom of the kettle operated from the top by means of a valve stem supported by a yoke across the top of the furnace.

Heated Drains Sometimes Required

Its advantage consists in the fact that, when it is closed, none of the product to be treated is left standing in the outlet pipe. Whenever center valves are supplied with tinned copper kettles, the valve and spout should also be tinned to the end. A bibb cock outlet is used where thin liquids are to be handled and a molasses gate is employed when a thick liquid is to be handled.

A heated drain may sometimes be required to prevent thick liquids from congealing in the outlet pipe. An extra burner is supplied under this outlet pipe as shown in Fig. 7.

Fig. 10 shows a furnace with lid, and bibb cock outlet —the legs being an extension of the stiffening channels.

Fig. 11 illustrates a regular water-jacketed cauldron furnace with copper kettle.

Fig. 12 shows a small (10 gal.) furnace with bibb cock outlet. This furnace is galvanized to meet special

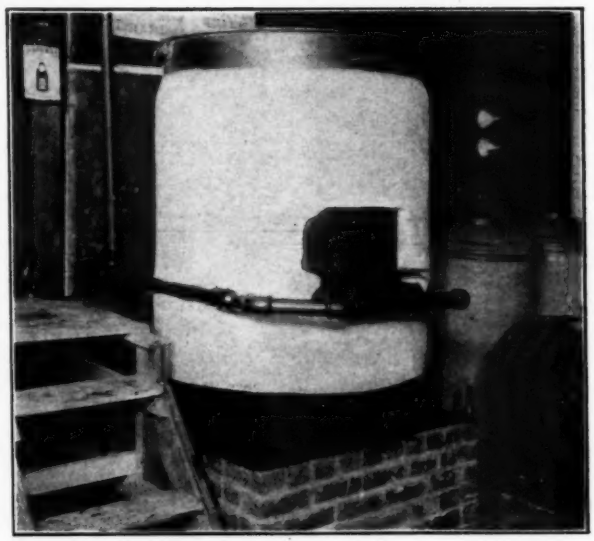


FIG. 8. CAULDRON FURNACE WITH COPPER KETTLE FOR SYRUPS

conditions—note the shield over the air mixers to prevent drippings clogging them up.

Fig. 13 is of interest as being unusual. It is a special cauldron furnace for boiling felt and glue. It is a low temperature appliance used in the wall-paper industry. Special note should be given to the thermometer which is placed in the flue. In this way there is a safe-guard against overheating.

Fig. 14 is a water-jacketed cauldron furnace with the filler made part of the jacket. The jacket and kettle are thus combined. This is used for cooking gelatine for the making of capsules, a temperature of about 180 deg. Fahr. only being required to melt the gelatine and cook it.

(*Continued on page* 135)

Industrial Fuel Engineer Must Be Discoverer, Scientist and Artisan

I. Lundgaard Discusses Problems of Industrial Gas Engineering—Fuel Saving by Means of Regenerative Furnaces—Heat Conservation

Industrial progress has three distinct vehicles for forward movement, viz.: discovery, science and the arts.

The discoverer uncovers new physical phenomena, the scientist co-ordinates these phenomena and formulates their general physical laws and the arts make useful application of these physical facts and laws.

Both reason and history will affirm the statement that true progress is most rapid when its three vehicles or means of promotion succeed each other in order mentioned; the art of application without the aid of science is like a vessel at sea without charts, declared I. Lundgaard in his paper on industrial gas engineering presented at the joint meeting of the American Gas Institute and the National Commercial Gas Association industrial fuel men in New York City, Jan. 26.

Without further generalization I'll get down to the business at hand, industrial gas engineering. An engineer, to fulfill his mission, must combine within himself the discoverer, the scientist and the artisan. Without all three he is unbalanced and unfit to shoulder the responsibilities placed upon him.

The whole development of the industrial gas field bears witness to the existence of an unbalanced condition of a most serious character. I make this indictment not in the spirit of deprecatory criticism, for I realize fully the difficulties confronting us, but because I am going to ask that all who are directly or indirectly responsible for progress in this field make renewed efforts and further engineering progress for the benefit of the industry.

The principal discoveries in the gas fuel field are of comparatively ancient origin, but the scientific treatment accorded the phenomenon of gas combustion is woefully inadequate. We are to-day unable to determine by computation the flame temperature of a given gas with any degree of certainty. Such a determination involves the use of specific heats of various gases at high temperatures, and the phenomenon of dissociation.

The laws of specific heats laid down by Mallard and Le Chatelier are heralded by some engineers and scientists as being basic facts and denounced by others as grossly exaggerating the variations caused by higher temperatures.

Knowledge of Effect of High Temperatures

Dissociation is something very few authors dare to mention in terms approximating certainty in view of the almost complete lack of research data. Industry demands higher and higher furnace temperatures and these phenomena should not be permitted to long remain in the present state of obscurity in view of their growing importance.

Can anybody justify the use of the term science as applied to our knowledge of the various phenomena of heat transfer? We speak glibly of conduction, radiation and convection, but pin us down to facts in regard to almost any simple practical problem and you will be met by an empty stare.

What about our knowledge of the effect of high temperature on various construction materials? Is it sufficient or do we need more data? Most decidedly we do.

Let us consider for a moment the effect of flame temperature.

The highest temperature that could be obtained by the combustion of a certain gas under ideal conditions has been termed its theoretical flame temperature. In practice the actual flame temperature reached is much lower than the theoretical flame temperature and depends upon the perfection of the insulation of the flame and the amount of air used to sustain combustion.

Let us assume that we desire to heat a piece of steel to 2,200 deg. Fahr. and we have before us two furnaces one capable of maintaining a temperature of 2,600 deg. Fahr. and one only 2,400 deg. Fahr., both consuming the same amount of gas.

When first inserted the steel would heat about 10 per cent. faster in the furnace having the higher temperature but near the finishing temperature the speed of heating would be twice as great. The higher temperature furnace would complete the heating of the steel in perhaps 60 per cent. of time and consequently save a corresponding amount of gas.

In the case cited *the attainment and maintenance of a high furnace temperature can readily be appreciated as being of tremendous economical importance.* Preheating of the air and the gas only 200 deg. Fahr. would accomplish that difference between the two furnaces. Why is it that preheating is not generally resorted to for high temperature operations? Particularly when the preheating can so easily be arranged by the use of the exhaust gases from the furnace and therefore consume no additional fuel.

We have in the city of Rochester several regenerative furnaces consuming about 4,000 cu. ft. of gas per hour each. Had these furnaces not had regenerative chambers the gas consumption would have been conservatively estimated twice what it now is so that regeneration saves 4,000 cu. ft. of gas per hour per furnace. With gas at 40 cents the hourly saving is $1.60, and as these furnaces operate 800 hours per year the yearly saving is $12,800.00. I can assure you that the maintenance of the regenerative apparatus costs much less than 10 per cent. of the yearly saving.

Regeneration in Small Furnaces

It seems to be a generally accepted rule that regeneration has no justification in the field of small furnaces and it is claimed to be borne out by tests that this should be so. I saw one regenerative furnace once that was a failure. The necessity for balanced draft conditions in the furnace chamber was so utterly overlooked that the hot gases blew out through the door cracks instead of going back to the regenerator.

A good many furnace operations are subject to limitations of temperature because of the work to be done in the furnace. The maximum obtainable flame temperature can therefore not be used and part of it must be dissipated either by excess quantity of air or by direct heat loss.

The flame temperature of gases bears about the same relation to a furnace as voltage does to an electric motor. The speed of a motor can be controlled by dissipation of voltage in armature resistance, but the efficiency of operation suffers accordingly. The furnace regenerator gives us the means of returning to the furnaces the dissipated heat much as the field-controlled motor by strengthening of the field creates additional counter electromotive force within itself and saves the current input. The ideal regenerative furnace can theoretically operate full efficiency regardless of furnace temperatures while the simple furnace must throw away heat to accommodate various furnace temperatures.

What stands in the way of development along these lines? It is the inertia of old habits, lack of appreciation and unwillingness to back up our faith with the cash necessary to get the information we need. It is true that the scientists have not given us the complete fundamental theories, but we know some things and we can find out more, and maybe we can get the scientific institutions to give us a lift if we try. Let us try.

Counterflow Heating

Another much neglected principle is counterflow heating where the material to be heated is brought into the hottest part of the furnace against the outgoing gases. This generally involves the use of heating machines of some kind except for the heating of gases and liquids. I believe that this field is capable of material extension and must be given serious attention.

In large furnaces the matter of quick and convenient means of loading are important both from a labor-saving and gas-economy point of view. The open furnace door dissipates heat at a tremendous rate.

Many furnace builders do not put insulation on their furnaces, while a little of it certainly is good investment, and, in most cases, the best insulation we can get is cheap when you consider the benefits of it. Remember that gas is an expensive fuel and that we must be careful what we do with it, and what constitutes good practice when you burn soft coal is not likely to be right for gas.

After all details of furnace design have been properly taken care of there remains another just as important side to the question namely, proper operation.

The furnace must be operated at the proper temperature for the work to be done in it, and sometimes the chemical composition of the furnace gases is a factor as in heat treatment of steel. In all cases correct proportioning of gas and air is of prime importance.

Some progressive appliance builders have developed and applied various methods of positive automatic control, but universal practice is to leave the matter to the judgment of the furnace man. How much good gas is wasted every day by these furnace operators would be hard to guess, but I venture to say that if the truth were known it would be unpleasant knowledge to any man with true economic consciousness.

Should we not give our attention to means of correct proportioning of gas and air—stimulate their development and use? Most decidedly we should.

I have so far talked about a good many things, many of them old stories to most of you, but I don't believe the repetition has been harmful if I may venture to give my personal opinion.

I am now going to talk about the stumbling block. You know there is one, and a good big husky one at that.

Practical Considerations in Building Furnaces

I am going to fancy that one of the furnace builders present at this meeting took my talk seriously and went home to his shop and built a furnace well insulated with liberal regeneration, balanced draft, positive control of mixture, automatic temperature regulation, perfected charging apparatus, and on the whole built a device as nearly right as possible.

It is when he tries to cash in on his ingenuity that he runs into the stumbling block and his fall is very likely to cost him his financial neck.

He can't sell this perfect thing. Why? Because gas furnaces are sold on the basis of price competition. Gas furnace builders know this and act accordingly. They are forced to do it to save that before-mentioned important organ—the financial neck.

We, the industrial gas men of the gas companies are the ones who can effectively guide the efforts of furnace manufacturers. The responsibility is, in the last analysis, ours not theirs. Our biggest and most neglected problem is to give quality a fair chance. Let us accomplish that and the other things will follow.

Price competition alone will not give quality a fair chance. Bare price competition is destructive. Fair competition is the biggest constructive element that progress knows of. Let us attempt to remove this stumbling block of unfair competition.

The first step in this direction is to find means of comparing performance of appliances so that when you ask for bids on a furnace you will not only be able to obtain price, but information as well in regard to its behavior when in operation. To do this we must have definite and fair rules for tests of furnaces to give answer to such questions as have to be answered.

To illustrate: You ask for bids and want information on the following points:

1. Maximum gas consumption for given air and gas pressures.
2. Maximum temperature that the furnace will stand continuously.
3. Time required to reach this temperature with maximum (rate of) gas consumption.
4. Gas consumption to maintain a given temperature with the furnace empty and door closed.
5. Maximum temperature variation in the oven space.

Having received the answer to these or other questions that might be decided upon, and feeling some of the integrity of the bidder you are in a position to intelligently award the order for the furnace.

But it would be hopeless to try to obtain such information without having previously established definite and reasonable test specifications acceptable to both the manufacturer of the device and the buyer.

Those bidders who do not receive orders under this system will quickly learn the reasons why and set about to remedy the defects of their product.

It will not be a case of the survival of the fittest, but rather the survival of fitness. High standards never destroy; they always promote business. The complete absence of performance standards for gas appliances is the saddest reflection on the status of the art and something to get to work on the sooner the better. Honest and earnest manufacturers will certainly welcome a change in the situation and give their hearty co-operation in the establishment of fair, reasonable and practical performance standards.

Cultivating the Qualities that Determine Success or Failure in Engineering

R. T. Claud Asserts that though it Has Been Proved to a Certain Extent in Many Cases that Important Qualifications Are Inherent in Man, Still it Is Possible to Develop Them to a Considerable Extent

Taking as his basis the weights of the various qualities demanded of the successful engineer, R. T. Claud discusses those qualities which are accorded the greatest importance, yet which are seldom consciously cultivated. Professor Mann's compilation is as follows:

	Per cent.
1. Character, including integrity, responsibility, resourcefulness, initiative	41.0
2. Judgment, including common sense, scientific attitude, perspective	17.5
3. Efficiency, including thoroughness, accuracy, industry	14.5
4. Understanding of men, executive ability	14.0
Total	87.
5. Knowledge of engineering science fundamentals	7.
6. Technique and current practice	6.
Total	13.
Grand total	100.

Granting that the 13 per cent. qualifications are absolutely necessary and should be kept up to date with the progress of the science, what of the other 87 per cent.? asked Mr. Cloud. What is being done to cultivate the qualities that not only go to make the successful engineer, but the man? Many of us have laid out elaborate systems and spent considerable money to care for the 13 per cent., but few have given more than passing interest to the 87 per cent., assuming, either that these qualities would care for themselves or that they were inherent to the man and could not be cultivated. To a certain extent this has proven to be the case with many engineers, but often the most insignificant wild flower becomes the most beautiful specimen of the floriculturist art under proper cultivation.

The "87 per cent. qualities" can be acquired and improved by systematic culture the same as technical knowledge, and every engineer looking for self-advancement should apply some of his engineering principles to himself in devising a program to meet the requirements of his own particular case.

Self-conceited, indeed, is the man who by a rigid introspection cannot see the qualities which are lacking in his own case, and no program of action laid out by another would be followed by such a person, no matter how simple this program might be. Therefore, the author makes no attempt to arrange a definite program or more than merely blaze a small path through the intellectual forest of thought. There are many paths and many routes that reach the same destination.

Benchmark of Character Is Ideals

The greatest weight given any of the qualifications is character, including integrity, responsibility, resourcefulness, initiative. To my mind the "bench mark" of character is ideals, not the ideals of the visionary, nor yet the ideal too easily attained, for attainment satisfies and we cease to strive.

The man with a high ideal of integrity will ever be upright and with the proper ideal of duty his employer will never have cause to suspect that he is the anonymous author of the book entitled "Stalling Through Life."

The engineer is the bridge between the scientist and the business world and is required to balance the ideals of one against the commercial requirements of the other.

The city planner, no doubt, sees the ideal city, the architect his ideal of beauty in edifice, but each necessarily modifies these to meet practical requirements.

Ideals are standards—standards of motion, it is true, but men like to feel themselves working for a cause. They like to see products shaped under their direction, and to feel the satisfaction of doing work that will live after they are gone to their reward. Find this element in your own work and see what a difference it makes in the results you obtain. By all means form definite ideals. Make a platform that embodies—no! on second thought, I will not make your platform for you. It is to be yours, not mine. Make it yourself, and improve it as your fields of knowledge and experience expand.

Judgment

Necessarily in the limited scope of these pages only the high points can be touched, so no attempt is made to outline a course in logic or to more than touch upon some of the principal characteristics of each division.

The outstanding of good judgment is clearness in thinking. In passing judgment we merely take our concepts of various things and build with them the edifice of thought. What engineer would build a structure without first knowing the nature of his materials, and carefully designing each individual part? Yet how often we pass judgment on even important matters without clearly seeing the concepts that go to make up the ideas involved. The engineer should welcome every opportunity to add to his stock of concepts and when examining new materials or methods should be certain that the elemental points are fully understood and filed in the index of his mind for instant reference. No concept is perfect until it can be clearly expressed in words. In making investigations of new materials or methods new points of interest should be sought, otherwise the attention cannot be continuously directed to the objects studied.

A synonym for good judgment is common sense, and it should be understood that systems are the means, not the end sought. It is related that a merchant invested in a very elaborate card system. After a week's coaching by an expert accountant he was left to go it alone.

A few months later the salesman who sold the system dropped in for an informal visit and inquired as to how the system was working. "Fine," says the merchant. "Very good, and how's business?" asks the salesman. "Oh, we haven't any time for business," retorted the merchant. "We are too busy keeping up the card system."

Efficiency

Much has been written on the subject of efficiency of late. Many engineers sneer at the mere mention of the name, assuming, I suppose, that it is some new religious cult and, therefore, not to be entertained for a moment. True, many are the comical commercial blunders committed in the name of efficiency, but are not these blunders errors in the application of efficiency instead of mistakes inherent in efficiency itself?

However, these same engineers try to arrange their work in a logical manner and most of them unconsciously apply some of the efficiency principles of their daily work. A good plan is to consider your brain your

factory, the product of which is ideas. Now, what is desired, quantity or quality? Arrange your factory accordingly.

One man has found a method of saving time by arranging the articles on his desk in a certain manner so that he can reach any desired instrument, pencil or article without looking up from his work and has trained himself to unconsciously replace these in the same place each time. Another has found that a box for pencils with separate compartments arranged with portions cut away so that the fingers grasp the pencil at the exact location for writing or drawing, greatly facilitates draughting work. The many little kinks that suggest themselves when you once direct your attention to the matter will surprise you, and while the saving in time and labor may be very small in each individual case, in the aggregate this saving is often considerable.

Where routine work is done, a time table should be provided for commencing each operation of the day's work. For instance, much time can be saved by arranging to do all of your dictation at a certain time each day and saving all of your work for that particular period of the day, except such correspondence as would suffer for the delay.

In arranging your work it is a good idea to do the difficult and unpleasant things first, as the accomplishment of these things leaves the mind in a better attitude for the balance of the work.

A very successful engineer makes it a rule never to make an important decision before 10 a. m. or after 3 p. m., giving as his reason that it takes an appreciable period of time to get his faculties to operate smoothly and that after 3 p. m. the brain is likely to be fatigued.

The truly efficient is a machine; however, you should be machine enough to allow for the constructive thinking that is essential to success.

A terse definition of efficiency is maximum results for minimum effort.

Executive Ability

Executive ability has been defined as the act of making one's living by the sweat of another man's brow. The modern executive power, however, is based not on the old boss and bossed theory, but on the plan of helpful co-operation between the employer and employee, and a man with executive aspirations should develop this attitude and put it into daily practice. He should habituate himself to the other man's viewpoint and should imagine himself obeying his own orders.

He should understand men not for what they are, but for their potential ability; no one but the expert recognizes the uncut diamond.

Resolve to-day to cultivate the 87 per cent. It marks the difference between the tyro and the adept, the amateur and the expert, the N. G. Near and the Engineer.

Conveyor Provided with Adjustable Troughing Rollers

Patent No. 1,208,883; described in Patent Office *Gazette*, 12-19-16, page 820. Edward H. Zieber, Philadelphia, Pa., assignor to William T. Plummer, Ardmore, Pa. Filed May 26, 1915. Serial No. 30,651. (Cl. 193-27.)

In this conveyer the troughing rollers are separate and independent, and materially overlap the horizontal roller. The troughing rollers are adjustable, being mounted on swinging arms fastened to the supports and capable of small adjustment so that the rollers of several sets are maintained in uniform adjustment.

Changes in Dehydrating Apparatus at Rochester Gas Works Reduce Water Content of Tar Almost Two-Thirds

W. H. Earle Describes Methods of Remedying Undesirable Condition—Changes Suggested by W. N. Whitney

William H. Earle in *Gas and Electric News* describes changes made in the dehydrating apparatus of the Rochester Railway & Light Company which have resulted in reducing the water content of tar shipments from 25 or 30 per cent. to as low as 5.5 per cent. and never more than 11 per cent.

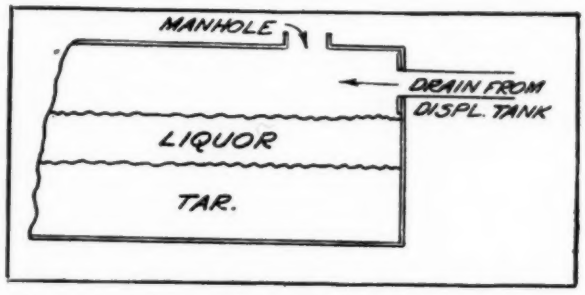


FIG. 1. SECTION OF TAR WELL SHOWING ODD LOCATION OF DRAIN FROM DISPLACEMENT TANK

For over a year the gas works has experienced great difficulty in dehydrating its coal tar. Shipments have in some cases run as high as 25 or 30 per cent. water. While the source of the trouble was probably largely chemical in the nature of the gas coal from which the tar was derived, and in the heat treatment to which it was subjected in the retorts, it was felt that the remedy lay chiefly in improving the methods of handling the tar.

A survey of the tar situation disclosed the following conditions:

Displacement tank, 15.5 per cent. water; inlet section of separator, 18.5 per cent. water; tar section of separator, 17.0 per cent. water; tar well, 13.0 per cent. water before draining disp. tank; tar well, 27.0 per cent. water after draining disp. tank; storage tank, 16.5 per cent. water; dehydrating tank, 16.0 per cent. water at top; dehydrating tank, 7.5 per cent. water at bottom.

Note that after drawing off the displacement tank into the well, the water content more than doubled. Obviously there was a very decided source of trouble. The arrangement of the tar well and the drain line from the displacement tank is shown in Fig. 1. The tar discharged at a head of about thirty feet and spilled into the well at the top with such force that the flow agitated the contents of the well and churned back into the tar, the liquor which had previously separated out. Further, it was found that the overflow line from the top of the dehydrating tank emptied into the tar section of the separator at the mouth of the line going to the tar well. And every time tar was pumped into the tank, the water was displaced and discharged directly into the top of the well, acting as in the above instance.

The remedy, its application, and results are more quickly told. In the first place, the overflow from the dehydrating tank was moved to discharge into the receiving section of the separator. Next, a new drain line was run from the displacement tank, and carried down into the tar well to a point just below the constant

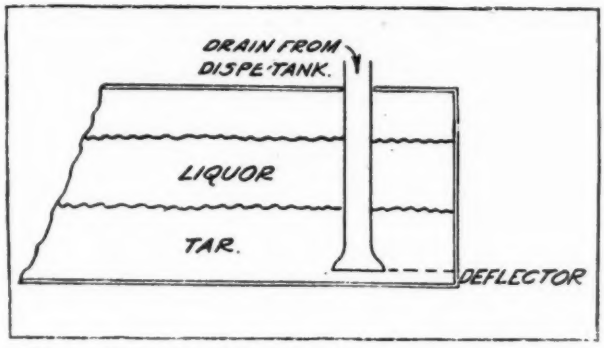


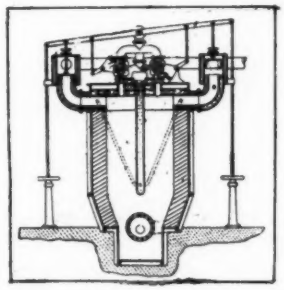
FIG. 2. NEW LOCATION OF DRAIN FROM DISPLACEMENT TANK

tar level, as determined by the elevation of the tar pump suction line. Thus the material discharging into the well, was carried to a point where agitation of the entire mass was eliminated, and where the liquor on top could not be driven back into the tar. This arrangement is shown in Fig. 2. Conditions immediately showed improvement. Subsequent shipments show an average water content not to exceed 8 per cent., the minimum has been 5.5 per cent. and the maximum 11.1 per cent. One more improvement in equipment is now in progress. That is, the installation of a new and better type of heating coil in the dehydrating tank.

In addition to the above alterations, a new heating coil has been installed in the dehydrating tank. It is a continuous spiral of ¾-in. pipe, turned upon an 8-in. diameter, standing 15 ft. over all, and has a total heating surface of about 200 sq. ft. A small spiral steam coil has also been located near the suction pipe of the tar storage, to facilitate handling the tar at that point. The changes which are chiefly responsible for improved conditions are those in connection with the tar well as outlined, and for them Mr. William N. Whitney is primarily responsible.

Patent Descriptions

Gas Producer Has Steam Generator on Top



WATER TANK ACTS AS STEAM GENERATOR

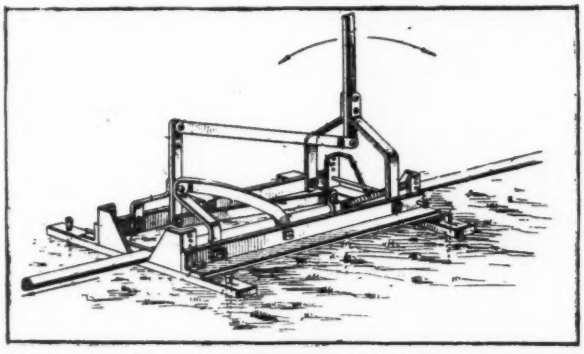
Patent No 1,208,689; described in Patent Office *Gazette*, 12-12-16, page 708. John Stewart, Codnor Park, Alfreton, England, and William Stewart, Motherwell, Scotland. Filed Nov. 18, 1910. Serial No. 593,064. (Cl. 48-83.)

This gas producer has two combustion chambers, separated by a hollow partition. On top of the producer is a water tank which acts as a steam generator; the hollow partition is likewise a water leg, with the upper portion connected with the steam space of the water tank. A system of valves provides the means for passing air downward through the incandescent fuel of one of the combustion chambers and upward through the incandescent fuel of the other chamber, additional air being supplied in the second chamber. Adequate take-off pipes are supplied to convey gas away from the producer, and means are provided for supplying each chamber separately with fuel.

Machine Pushes or Pulls Pipe

Patent No. 1,208,472; described in Patent Office *Gazette*, 12-12-16, page 634. Horace A. Brown, Ottumwa, Iowa. Filed Aug. 8, 1916. Serial No. 113,703. (Cl. 254-29.)

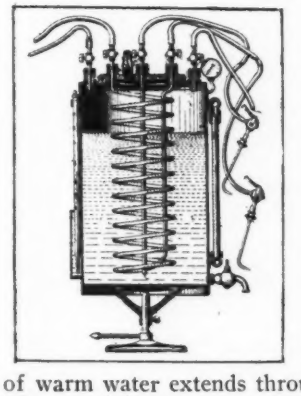
This machine is securely fastened to the ground and the pipe placed in the holders or guides. These guides consist of plates forming a V-shaped notch in which the pipe rests. Two bars extending through the two sides of the machine and placed horizontally and at right angles above the pipe, one at each end of the machine, prevents the pipe from raising out of the notches. A



BARS AT EACH END PREVENT PIPE FROM BEING RAISED OUT OF NOTCHES

clamp, shaped like a C, is fastened around the pipe, this clamp always being held in an inclined position by a spring. Fastened to the clamp is a link member which is in turn connected to the handle of the machine by a series of levers and links. By this means the motion of the handle is transferred to the pipe.

Gas Used to Heat Water and Air for Dentist's Use



Patent No. 1,209,599; described in Patent Office *Gazette*, 12-19-16, page 1063. Harry W. LeFevre, Denver, Col. Filed June 14, 1915. Serial No. 33,925. (Cl. 32-28.)

This apparatus is used to supply heated water and air for a dentist's use, a gas bunsen burner providing the heat. The enclosed coil contains compressed air, with inlet and outlet pipes, and the pipe for the delivery of warm water extends through the center of the coil. The remaining pipes are for the purpose of supplying water and air to the tank, the water being forced out by compressed air.

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Gas for Industrial Fuel Cheaper in Particular Cases Than Crude Fuel Even Though First Cost of Latter is Nothing

We are all greatly interested in the sale of gas for industrial purposes. Only those who have studied the subject appreciate the great diversity of problems which arise and the complexity of some of them.

The success or failure of a man who starts out to sell industrial appliances is dependent upon his knowledge of the mechanical details of the apparatus which he is to sell, rather than upon his selling ability.

It is poor policy to sell a man the wrong thing or in fact anything that he does not need, and it is only by diligent study and a mechanical aptitude that an industrial salesman really succeeds.

In this issue will be found an article covering just one class of industrial appliances, namely, cauldron furnaces. Their field is enormous, and the diversity of their application beyond the imagination of the uninitiated.

One point which we learn from this article, and which will bear repeating, is that occasions arise where gas fuel is cheaper than any other fuel, even though the competing fuel has no first cost. This is a case where the time of firing with any other fuel is worth more than the cost of gas used in the operation. It should always be borne in mind that the cost of gas is only one, and frequently the smallest item of cost entering into a finished product.

Free Lighting Installation

In England, as a means of compensating for the poor direct illuminating quality of the gas being furnished, at least one company is pushing hard to secure a general adoption of the incandescent gas mantle. One means adopted to attain this end is by taking the burden of first cost off the consumer and supplying and installing mantle burners free of charge.

American gas companies are not supplying gas such as the English companies are sending out, yet the total elimination of the open flame burner is just as desirable an end to us as it possibly can be to our English coworkers. We are supplying a product that we know is highly meritorious as an illuminating agency. Yet we continually learn that the consumer—the court of final judgment—does not seem to lend as responsive an ear to our arguments as we would like to have him do. Why?

For one reason because, though gas is the cheapest illuminant, a gas-lighting installation is somewhat of a luxury. When we move into a new house we can secure electric lighting for practically nothing. The electric company does not consider its sole duty is to furnish us electricity. It furnishes us the bulbs to use it with as well.

If we are considering gas, we must be satisfied with

open jet burners or lay out quite a sum of money for burners, mantles, etc.

It is quite true that the electric company makes us pay for those lamps—rental they call it—but the payments are easy; just a fraction of a dollar each month.

Sometimes this journal thinks large gas companies could well afford to employ a specialist to study the types of people they serve, their weaknesses, mannerisms and habits, etc.

In the great cities, for instance, there is a large salaried class. A large proportion of this class is constituted of men who earn good incomes, and who do not give much thought as to tomorrow; in other words, men who live up to that income and who are totally unprepared to meet any financial emergency. Such men are frequently potential purchasers. House-builders, real estate men, talking-machine manufacturers, etc. regard them highly, but they do business with them on the installment plan.

When such a man moves to a new apartment he has provided just about enough money beyond his current needs to pay for the moving and those few racks, shelves, etc. that are a necessity in any abode where he expects to establish himself for some months.

This man may be a good gas-lighting prospect; in many ways he is an exceptionally good one. Its cheapness alone would make a great appeal to him, for, in a theoretical sense, he is a great economist. But, absurd though it may seem, he will not consider he can afford to install gas lights. For one thing, even ten dollars spent outright for such a purpose would seem an impossible expenditure, since, as has been stated, he has provided barely enough in advance to get through the moving. Besides—he is of the nomad type—he does not know how long he will remain in that apartment, and ten dollars looms large in proportion, when it is considered that his total lighting bill is around twenty-four dollars a year.

If the gas man were to make things as easy for this class as the electric man does, we wonder how many more gas-lighting customers we would have? It is certain that the number would not be small.

But is it worth while? We are securing at present, a large industrial market. Gas for cooking continues to show a great increase. In isolated cases gas for lighting also shows an increase, but, in general, the U. S. Geological Survey tells us, it is decreasing. Can we do without our lighting business? Can we afford to sit supinely by and see it gathered in by electricity, in many cases simply because it is more convenient for the consumer to have electricity supplied?

There is no substantial reason why our lighting business should not be developing at just as rapid a rate as our cooking business. It will never develop with the open-flame burner, and it will not develop with the mantle burner if we continue to make that burner difficult to obtain.

Making a Market for Coke

The market for coke has become a very important factor in the gas business. It is but a question of time until the heat unit standard of gas quality will be generally in force throughout the country. What this will mean in the way of increased coke production is clearly indicated in the outline of the plans of the Rochester Railway & Light Company to gradually increase the proportion of coal-gas in its output until practically all the gas it makes will be coal-gas. Also gas companies are beginning to look more closely into the by-product oven as a gas producer. The question of developing a consistent market for the coke produced, therefore, begins to assume an immense importance.

At the present time 80 per cent of the coke produced in this country is used in the manufacture of pig-iron. This is an uncertain market—too uncertain in fact for a gas company which, year in and year out, is called upon to supply a relatively definite amount of gas. Such a market necessarily varies with industrial conditions. In certain years it would take up all the gas-producing industries could provide, and go to the beehive oven for the surplus. In other years, under present conditions, the gas-making industry would not be able to find storage space for its surplus coke and certainly would go bankrupt under the burden of the idle capital represented.

Much has been done by individual companies in providing local domestic markets. Considerable more has been done by such companies in treating and handling their coke in such manner as to adapt it to domestic uses of various kinds. What is urgently needed is that the gas industry as a whole take up this effort and teach the people of the country to use coke for every domestic purpose for which they now use coal.

We cannot hope, from present indications, to do much in the way of steam-raising by applying gas directly. But there is no practical reason why steam-raising by coke should not be made advantageous. This is a matter wherein is needed study and research, but it is by no means beyond the range of possibility.

In England they are using coke to an extent to raise steam for the generation of electricity. All of this is more or less in the nature of an experiment, and due to a large extent upon conditions caused by the war, but there is no reason why such experiments should not be actively under way in this country. This is a responsibility that plainly devolves upon the gas industry. If coke can be applied advantageously to the generation of electrical power it is very much our business to show the electrical industry how it may be done. This market once obtained would be a consistent one, and practically regular in its demands.

Then there is the possible use of coke in some form or in some mixtures, perhaps, for railway locomotives and steamships. All these possibilities require research, and serve more to emphasize the fact that the day is near

when the gas industry must, for its own continued prosperity, establish a large central research laboratory to study out its various problems.

The domestic market, however, is immediate; one that we can secure with present means and without an impractical amount of effort or expense.

Widespread educational publicity will gather in a good part of it. Intelligent treatment and preparation of our coke will hold this part once it is gained.

Will the Gas Man Write?

There is a great deal to write about in connection with the gas industry. There are many novel and successful methods of accomplishing certain results which have been devised and put into practice that the gas man in general would find considerable interest and profit in reading about, which have never been told except to a very limited audience. It is principally for the purpose of seeking and publishing such descriptions that gas journals exist. In proportion to their success in so doing will they prosper or decline.

This journal is of the opinion that the best person to tell about any such method is the man who originated it or one who is thoroughly familiar with its working out. As between having an article written on such a subject by such a man, who need not necessarily be a skilled writer, and having it described by a skilled writer who possesses but a superficial knowledge of the subject with which he is dealing, this journal would very promptly select the former.

Fully appreciating the importance of following such a course and the great benefit that would accrue to its readers if it could put its beliefs into practice, this journal during the past year decided to leave no stone unturned that would enable it to increase greatly the number of new names contributing to its pages. In connection with this decision it might be stated we did not receive much encouragement from those with whom we advised.

The firm belief in the delusion that the gas man will not write is too prevalent to be very comforting to the mind of an editor who is confirmed in the belief that, unless the active workers in the industry provide the bulk of the matter published in his journal's pages, that journal cannot attain for its readers its maximum possible usefulness. One hears this statement made so frequently by those who assure us they know the gas man from the tips of his toes to the top of his head, that one becomes almost convinced, despite his own views, that it might be true.

Nevertheless this journal took such steps as it deemed best adapted to accomplish the desired result. It explained, as best it could, to the gas man himself the immense importance of such work to him and to others engaged in the industry.

It knew that his available time for such work is limited and that keeping up with the industry in these days of almost revolutionary expansion, is trying to the extreme, and that when he has finished his day's work he feels, and quite often justly, that he has expended about all the energy that he has in him to expend.

But it felt that a realization of the assistance and help he might give others in writing for publication some experience of his own that had in it a lesson or the germ of a constructive idea would be all that would be required to incline him towards such efforts.

This seemed quite plausible reasoning and we were quite satisfied that we had solved the problem. The immediate response, however, was not such as to provide much encouragement. It began to appear that our self-professed authorities, to a certain degree were right. Then a new angle to the situation was revealed to us.

We were conversing with a gas company official from a distant city, and asked him if it would not be possible to get some articles from that company's industrial man whom we knew had made several original installations. The reply was somewhat astonishing. It appears that it would be somewhat difficult to secure any assistance from this man for the reason that "in the past he had sent a number of contributions to journals and they had neither acknowledged receipt of them or even thanked him."

Experiences similar to this we are quite sure are very few, and the cause must have been errors of omission by no means frequent. But the thought is suggested that, perhaps, the journals have not done their part in emphasizing the importance of the gas man's contributing to their pages or in acquainting him of how very welcome their contributions are.

This suggestion inspired the AMERICAN GAS ENGINEERING JOURNAL—then the AMERICAN GAS LIGHT JOURNAL—to even greater endeavors along the line it was pursuing. And results began to become manifest. The response that was met with proved conclusively to us not only that the gas man would write, but that he would do so willingly when shown that he was rendering a useful service to his fellow gas men.

As a consequence names appeared over articles in last year's issues of the JOURNAL that had never appeared in any gas journal before and many things were told which we are certain the gas man in general found interest and profit in reading. We consider this, however, but a start, and desire, during the present year, to increase the range of our contributors many times over this. We want the bulk of our signed articles to be written by the men who are actually engaged with and are solving the problems of the gas industry.

If we attain these ideals we are quite certain that the AMERICAN GAS ENGINEERING JOURNAL will be able to render a service to the industry it serves, more valuable by far than it has ever before rendered.

FIG. 21. KETTLE REMOVED BY OVERHEAD CRANE

(*Continued from page 126*)

Fig. 15 gives in detail a self-contained steam-jacketed cauldron furnace somewhat similar to that shown in Fig. 6 except that it is mounted on legs. It is very suitable for cooking ketchups, and other products which demand temperatures a little above 212 deg. Fahr.

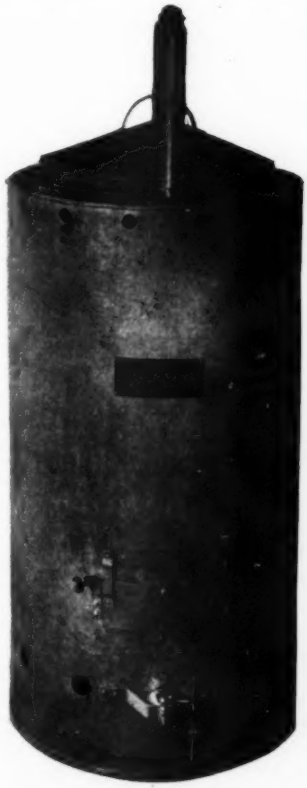


FIG. 13. CAULDRON FURNACE FOR BOILING FELT AND GLUE

Fig. 16 is a regular water-jacketed cauldron furnace with lid, molasses gate outlet and heated drain. It is of value in cases similar to that described in Fig. 7.

Fig. 17 is a regular cauldron furnace with special pump used for the manufacture of blueing. The operation is merely one of boiling the pigment.

Fig. 18 shows an appliance of special interest. It consists of a cauldron furnace on a truck with the agitator, etc., stationary. This is so constructed for melting and mixing an asphaltum compound. The first operation being inside the building, then—as certain inflammable oils are to be added, the cauldon is wheeled outside the building for safely and the rest of the work of heating the mixture carried on there.

Fig. 19 shows an installation of cauldron furnaces for the manufacture of sealing wax and paste. The process is merely one of heating and stirring the contents in direct-heated fur-

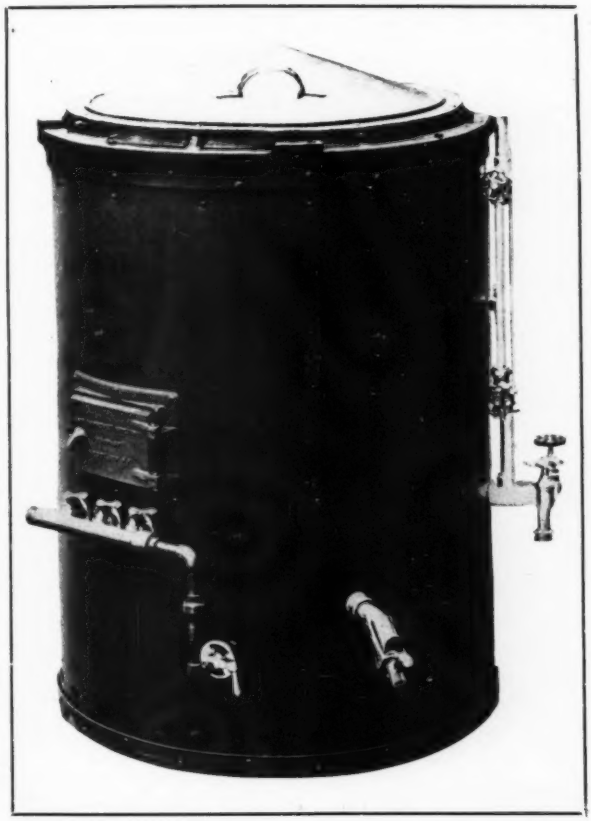


FIG. 16. STEAM-JACKETED CAULDRON FURNACE

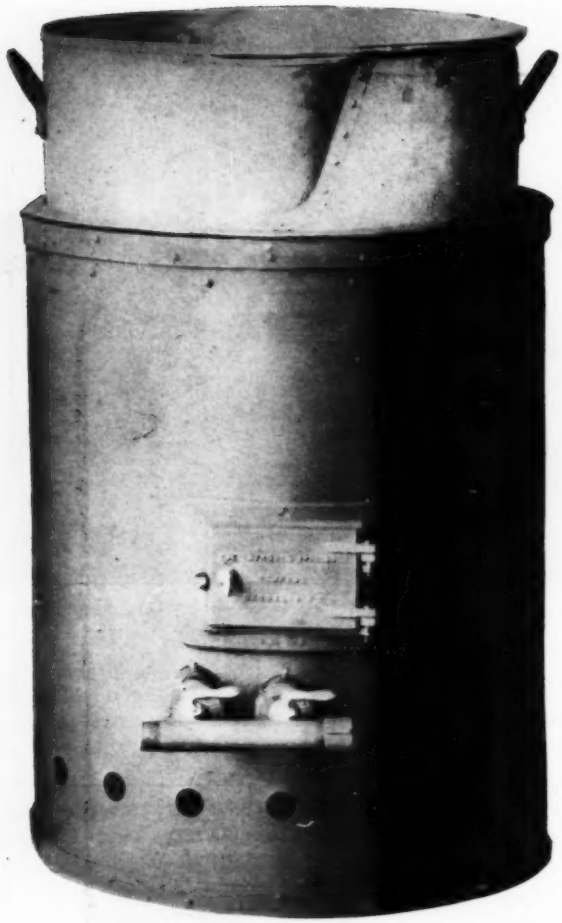


FIG. 14. JACKET AND KETTLE COMBINED

naces, but the scope and field for their use in this industry is a wide one.

Fig. 20 shows cauldron furnaces originally made for coal which have been converted to gas fuel. These furnaces being used to heat up ink compounds it was found that an even heat could not be obtained with coal whereas gas has given every satisfaction.

FIG. 19. USED FOR SEALING WAX AND PASTE

FIG. 10. SHOWING LID AND BIBB COCK OUTLET

Fig. 21 is another installation of a similar kind except that here the kettles are removed bodily from the jackets by an overhead crane.

FIG. 17. CAULDRON FURNACE WITH SPECIAL PUMP

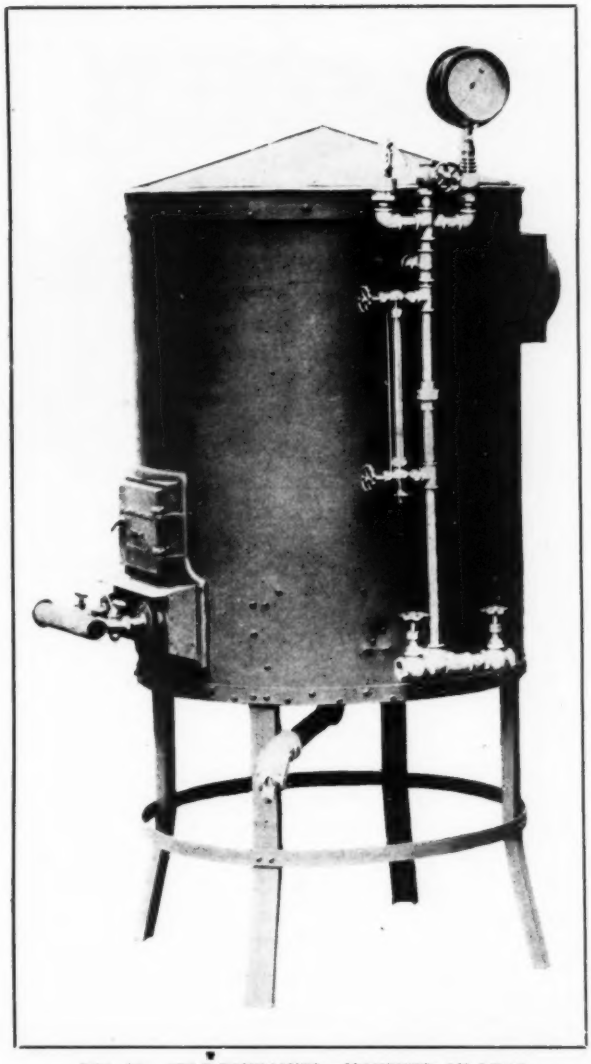


FIG. 13. SELF-CONTAINED—MOUNTED ON LEGS

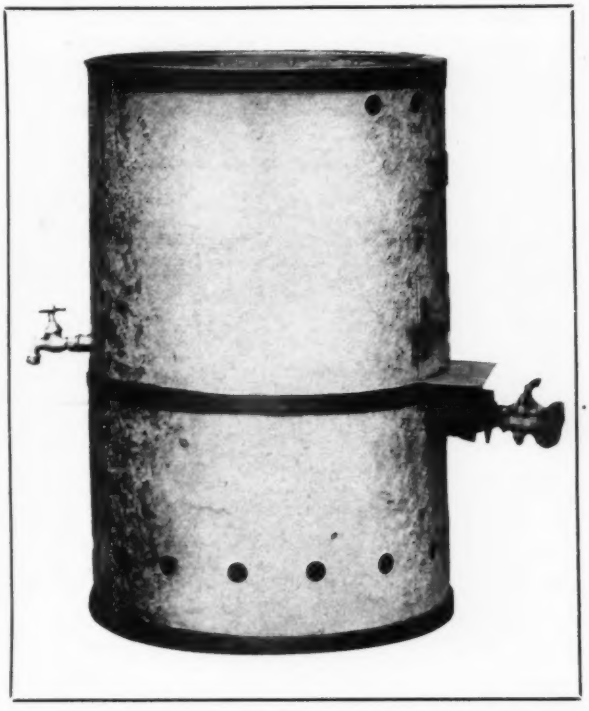


FIG. 12. GALVANIZED TO MEET SPECIAL REQUIREMENTS

Fig. 22 shows a cauldron furnace on wheels made for the manufacture of shoe enamel. In this case a burner having a capacity of about 600 cu. ft. per hour was fixed stationary on the floor and so arranged that the cauldron furnace (having a capacity of about 300 gal.) could be wheeled over it. The first stage of the opera-

FIG. 22. CAULDRON FURNACE ON WHEELS

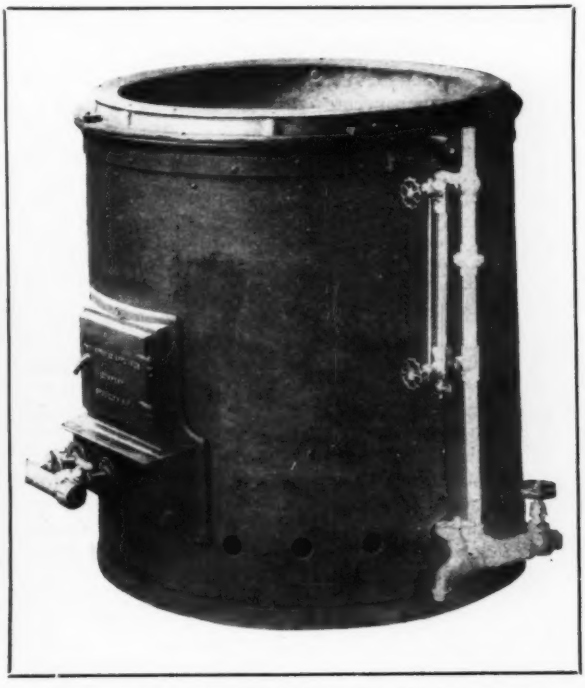


FIG. 11. CAULDRON FURNACE WITH COPPER KETTLE

tion consisted in boiling a quantity of oil with the necessary black pigment and after this had been heated for a certain period the furnace was wheeled out of the building where benzine could be conveniently added without danger of fire.

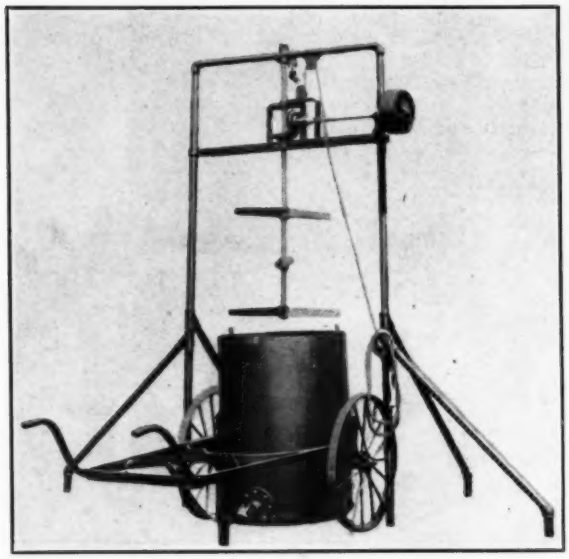


FIG. 18. CAULDRON FURNACE ON TRUCK

The whole thing is then thoroughly mixed and poured off into smaller cans for convenience in packing for shipment.

Sulphuric Acid Production in 1916 Much Greater Than in 1915

The production of sulphuric acid in the United States in 1916 was much greater than in 1915. The estimated production of sulphuric acid of strengths of 50 deg., 60 deg., and 66 deg. in 1916, expressed in terms of 50 deg. acid, is 4,475,000 tons, an estimated increase over the production in 1915 of 600,000 tons, or more than 15 per cent. The increase was distributed about equally between acids of strengths of 50 deg. and 60 deg. as there was a small decrease in the production of acid of strength of 66 deg.

The most notable feature in the sulphuric acid industry was the enormous increase in the production of acids of strengths greater than 66 deg. The estimate shows a production of these stronger acids of over a million tons as against a production of less than 200,000 tons in 1915. It is not feasible to express the amount of these higher acids in terms of 50 deg. acid; therefore the total given for them is in addition to the total given for acids of strengths of 66 deg. or less.

The estimated output of acids of strengths of 60 deg. and 66 deg. includes by-product acid produced at copper and zinc smelters. The output of acid so produced in 1916, expressed as 60 deg. acid, amounted to nearly 950,000 tons, or practically the same as in 1915. However, over 110,000 tons of acid of higher strengths was produced at these smelters, a quantity nearly double that produced in 1915.

FIG. 20. COAL FURNACES CONVERTED TO GAS

The market conditions throughout the country are reported to have been on the whole better than in 1915, and the value of the product will probably be somewhat higher than it was even during that year of high prices.

The estimates are based on returns received by Philip S. Smith, of the United States Geological Survey, from more than 95 per cent. of the producers and on estimates of the outputs of the rest. It is believed that the figures are reasonable and that they will approximate very closely the final figures, which will be made up when the complete returns are received.

Depreciation Should Be Charged to Cost of Production

The method employed by many manufacturers of charging depreciation to the profit and loss account is wrong, for while this method accomplishes the purpose of bringing the book values of assets in line with actual values, it does not make depreciation a part of the cost of production, states a writer for the *Iron Age* of Jan. 11. To accomplish this, all equipment, jigs, templets, or patterns especially made for a particular order, should be wholly charged to that order, and the reduction in value of all other buildings and equipment as determined by the schedule of depreciation, must be considered as a legitimate expense of the business and charged against the cost of the product.

The easiest method of accomplishing this is to estimate in advance the depreciation for each department of the plant for the ensuing year, and then assess one-twelfth of these estimates as monthly expense charges against the departments, making these depreciation charges in this wise components of the departmental expenses and factors in the departmental overheads. Depreciation charges that cannot properly be assessed against any particular department should be assessed against general expense and distributed over the product through the general expense factor.

Any differences between the estimated depreciation and the actual depreciation as revealed by the final inventory must of course be adjusted before closing the books.

News of the Gas Industry

Connecticut May Change Fiscal Year Date

The public utilities commission and representatives of some of the public service corporations of the state of Connecticut held a conference recently on the question of changing the time for the closing of the fiscal year for the filing of annual reports. Under the present law the fiscal year ends on June 30. The Interstate Commerce Commission has changed the date for the closing of the fiscal year for firms doing business of an interstate nature to Dec. 30 and the public utilities commission decided to sound the state corporations on the question. No opposition developed and it is expected the commission will order the fiscal year date changed.

Spokane Gas Exceeds Required Quality

Spokane, Wash., gas users received a bonus of more than 1 per cent. in the heating quality of the gas they purchased during 1916, according to a year's report worked out by the city chemist. One cubic foot of gas, according to city standards, is supposed to furnish 600 B. t. u. of heat. The year's records average 607 units to the foot, according to laboratory tests. The 1915 average was slightly greater.

The highest average month was February, with 620 and the lowest was November, with 595 units. Recent tests made this year show an average last week of 614.

Gas Holdings in Texas Sold

It was announced here recently that the Cullinan interests in the Greenville Gas Company had been sold to the Consolidated Securities Company of Cleveland, Ohio. The plant has been in operation here since 1905. W. A. Cullinan has resigned as the manager and will be succeeded by C. S. Burger of Brenham.

Electrolysis Blamed for Gas Loss at Hamilton

Investigations made by the consulting engineer and partly from Hamilton and Columbus, Ohio, disclosed the fact that electrolysis in Lindenwald in the vicinity of the power house and the car barns was abnormal and that conditions were worse in this section of Hamilton. It was discovered at the car barns that between the street car rail and the city water service pipe, there was enough current to light a lamp. It is in this section that the department has had most trouble with the mains, it being necessary to replace them at short intervals. According to officials of the department, a previous investigation made near this point, showed that the leakage was 250 cubic feet every 15 minutes or 1000 cubic feet every hour in fifteen feet of service pipe.

Like conditions, although not in such a great degree, exist in other cities with the exception of Cincinnati, which has the double trolley system, according to Engineer Wyer in discussing the situation.

The fact that the city had lost about $93,000 in leakage in the six years of purchasing natural gas from the Ohio Fuel Supply Company, and distributing it among consumers of the city led to the investigation of the leakage.

Coal Shortage Makes Heavy Demands for Gas

Extra gas stokers had to be employed during the past ten days to supply the very excessive demand on the gas system, due to coal shortage and cold spell, according to Manager P. M. Parry of the Utah Power & Light Company of Ogden, Utah.

Those families who were fortunate enough to have a gas service connection in their home did not feel the recent coal shortage, because they could depend upon the gas to not only do their cooking, but heating as well. Those who did not have gas room heaters lit the gas oven burners, and thus kept the house comfortable and their water pipes from freezing. In a large number of cases the gas ovens were kept burning to make doubly sure that the water would not freeze, figuring that a small increased gas bill would more than offset the plumber's bill for repairing the pipe.

Many improvements were made at the gas manufacturing plant during 1916, and all of this additional equipment was pressed into service to supply the demand. More equipment is to be installed during the coming summer to keep pace with the ever-increasing gas output.

Havre, Mont., Industrial Rates Cut

The Public Service of Montana has directed the Havre Natural Gas Company of Havre, Montana, to discontinue their industrial rate, and instead establish their rates on a sliding scale basis. It is feared that this step upon the part of the commission will not only interfere with the factories which are now securing this rate, but will have a tendency to discourage any manufacturer who might consider locating in Havre.

Consolidated Employee is Honored

John O'Connell, seventy-eight years old, general foreman over the manufacture of gas at the works of the Consolidated Gas Company, 501 East 21st street, celebrated the sixtieth year of his employment by the gas company, Thursday, Feb. 7. As an evidence of the high regard and esteem in which O'Connell is held, George B. Cortelyou, president, and Lewis B. Gawtry, a vice-president, and

JOHN O'CONNELL.

other officials of the Consolidated Gas Company, visited the works at East 21st street, where O'Connell listened to a few remarks by Mr. Cortelyou, and was presented with sixty (60) gold pieces—each gold piece representing a year of service. Charles F. Keegan, superintendent, and Charles H. Hodges, assistant superintendent of the East 21st street gas works, with many of O'Connell's co-workmen, were also in the audience.

O'Connell was born in the town of Mallows, County of Cork, Ireland, on Jan. 6, 1839. When thirteen years of age he came to this country and on Feb. 1, 1857, he entered the employment of the old New York Gas Light Company as a clerk in the coke office, which stood on the site where the East 21st street gas works are today. He has been a total abstainer from alcoholic drinks all his life, uses tobacco sparingly, but for many years has made it a daily habit to drink at least a quart of buttermilk; eats very simple meals. He would ordinarily be taken as a man of a trifle over fifty years of age, having a very clear, light complexion and pink cheeks. O'Connell is a widower and was the father of fourteen children, of whom two sons and

three daughters are living. He has five grandchildren — one a granddaughter, Kathleen O'Connor, employed in the Law Department of the Consolidated Gas Company, and a grandson, who is employed in the same company's branch office in Hester Street. He has a brother, Daniel, who has been in the employ of the Consolidated Gas Company for nearly fifty years, and who is now in the East 21st street gas works valve house, one of the points from which the gas pressure throughout the city is regulated. One of his sons-in-law is a night foreman over the manufacture of gas in the East 21st Street works, while still another son-in-law is foreman in the manufacturing of gas in the employ of the Brooklyn Union Gas Company.

On Jan. 5, 1917, O'Connell, on the occasion of his seventy-eighth birthday, was presented with a gold watch and chain by his fellow-workmen, who desired to show their appreciation of his long employment by the Consolidated Gas Company of New York. The inscription in the watch, then presented, reads:

"Presented to Mr. John O'Connell on his seventy-eighth birthday, by his men and associates, after sixty years' active service in the East 21st street works of the Consolidated Gas Company, as a token of the respect and high esteem in which he is held." The presentation speech at that time was made by Charles H. Hodges, the assistant superintendent of the East 21st street gas works.

Charles F. Keegan, superintendent of the East 21st street works, said that he remembered O'Connell once having absented himself from business on account of illness, but that that was a great many years ago, and Mr. Keegan said that he had never heard of O'Connell being away from business at any other time.

Tests Extended in Massachusetts

The tests which inspectors of the Massachusetts Gas & Electric Light Commission have been conducting for the past six months, at certain specified gas plants in the state, looking to the establishment by the commission of a calorific or heat value standard in place of the present candle-power standard, will be extended until April 1. At that time records of the output of gas by the several companies will be tabulated, and a report made to the commission, which will probably be the basis for the establishment of the calorific standard.

One object in extending the length of time for the tests is to enable records to be obtained which shall reflect gas characteristics under conditions which include those of very cold winter weather.

Hearing for Improvements Ordered

A hearing on Feb. 6, was ordered recently on the petition of the Malden & Melrose Gas Company to install a 270 horsepower boiler at its plant in Yankee Village, Mass.

Industrial Fuel Men Have Successful Meeting

A meeting of the industrial men from all parts of the country was held Friday, Jan. 26, at the Auditorium of the Consolidated Gas Company's building, 130 East Fifteenth Street, New York, through the combined efforts of the Industrial Fuel Committee of the National Commercial Gas Association and the Fuel Appliance Committee of the American Gas Institute.

After the usual opening C. E. Chapple, presiding as chairman, a discussion was opened on the continuation of a series of Industrial Fuel Reference Books, in which it was generally thought that they should be directed more toward the salesman than the customer.

To further the work of compiling specific test data of industrial installations outlined at Atlantic City, Nov. 16, 1916, it was recommended that a committee of five be appointed to draw up a form of data sheet suitable for publication and present it at the next meeting. They are to be assisted in this work by twenty industrial experts, to each of whom this sheet will be submitted for changes.

W. A. Ehlers, who is collecting data for the new reference books, in describing some of his works, said he believed test meters should be put on every new installation.

Mr. Barnes of the Old Colony Gas Company of Braintree, Mass., spoke of the need of supplying salesmen with correct data on quality, kind, amount and calorific value of the gas, so that each installation may be made to meet these varying conditions found in every part of the country.

At the afternoon session a paper was read by I. Lungaard of the Rochester Light, Heat & Power Company, Rochester, N. Y.

Considerable discussion followed on several subjects, one of which was whether apparatus should be sold on the efficiency basis or on the price competition basis. Frank F. Cauley of Chicago believed, with many others, that an installation should be sold on a strictly efficiency basis.

On the subject of who should finance the research and development work of industrial fuel appliances, it was suggested that some of the associations raise the money and supply it to certain manufacturers to carry on the experimental work. Someone suggested that it be left to the manufacturer to charge it on his estimate, while the Philadelphia delegate thought it should be localized and each gas company pay for its own development, then charge some of the expenditure to the consumer. Several plans are afoot, and more definite developments will be completed by the next meeting.

Horace Clark, secretary of the Illinois Gas Association, told of the work which has been established at the University of Illinois by the Committee on Methods of Securing Co-operation of Universities with regard to Gas Engineering Courses. C. E. Richardson opened for discussion the matter of where the National Commercial Gas Association should place its efforts—in one school or in as many universities, schools and Y. M. C. A.'s as it is possible to cover. Several suggestions were offered; one that universities be established at three points—one in the East, one in the Middle West and one in the Far West.

Several opinions on the value of "live" and "dead" window displays and lively discussion as to the possibility of establishing a nation-wide Industrial Week similar to the Gas Lighting Week closed the convention. The real action started along these lines and the new thoughts exchanged created the feeling that everyone was more than repaid for the time spent.

Florida Companies Re-Elect Officers

The annual meeting of the Tampa Gas Company and the West Tampa Gas Company were held recently in the office of Peter O. Knight. The officers of both companies were re-elected as follows: For the Tampa Gas Company: John Gribbel, President; David J. Collins, Vice-President and Treasurer; J. D. Shattuck, Consulting Engineer, all of Philadelphia, Pa.; Roscoe Nettles, Secretary and Manager; P. O. Knight, Attorney. John Gribbel, D. J. Collins and P. O. Knight are the board of directors. For the West Tampa Gas Company the officers are the same.

The officers then went to Lakeland to hold the annual meeting of the Lakeland Gas Company, which is owned by the same people. The annual meeting of the Plant City Public Utilities Company will be held shortly.

Goldsboro, N. C., Plant Sold

W. M. Crane, of New York, who has purchased the New Bern Gas Company and who has been in Goldsboro, N. C., conferring with the receiver, has returned to his home.

Mr. Crane, in addition to purchasing the New Bern plant, also bought the one at Goldsboro, N. C., and will now operate this also.

At present no changes are to be made in the two companies, but it is possible that the name of the New Bern plant may be changed later on, although no definite statement has been made.

Appeal for Reduced Rates in Milwaukee, Wis.

A petition to the Railroad Commission for the reduction of gas prices in Milwaukee to 50 cents for 1,000 cu. ft. of gas consumed was forwarded to Madison to-day by the city attorney. The price now ranges from 75 cents per 1,000 ft. for the first 7,000 ft., to 45 cents for 200,000 ft. or over.

N. C. G. A. Convention to Be Held in Detroit

No General Mid-Year Conference Will Be Held—Only Company Members of Association May Have Exhibits at Future Conventions

A meeting of the Board of Directors of the National Commercial Gas Association was held at the Hotel Statler, Detroit, Mich., on Jan. 12. At this meeting the following were present:

James T. Lynn, president.
C. E. Bartlett.
J. C. D. Clark.
F. J. Rutledge.
H. C. Fritz.
O. T. Knight.
W. W. Barnes.
C. A. Munroe.
W. Griffin Gribbel.
Jansen Haines.
C. W. Bennett.
C. W. Wardell.
Harry D. Schall.
Louis Stotz, secretary.

It was decided that the 1917 convention should be held with headquarters at the Hotel Statler, Detroit, Mich., the week of Nov. 12 to 17. The Hotel Statler offers every facility for a large convention and exhibition, and definite arrangements have been made adequately to care for the members and their guests.

The Hotel Statler has agreed to set aside 250 rooms. In addition to this the Hotel Pontchartrain and the Hotel Tuller have agreed to set aside a like number of rooms.

The board of directors considered many matters in connection with the work of the association at the meeting. It was decided to employ an assistant to William A. Ehlers, industrial fuel specialist. This assistant will make it possible for companies to have their industrial fuel work followed up in a systematic and careful manner after Mr. Ehlers has made the first survey of the territory, and on a basis of charge which will make it possible for any company, no matter how small, to secure the services of an expert at a minimum rate.

It was also decided by the board to allow C. W. Pratt, of the association's headquarters staff, to devote more of his time to field work for the purpose of acquainting companies with the activities of the association, to interest them in the services which the association has to offer, and generally to keep companies informed and familiar with the services which the association can render. It is hoped by these means to bring about a much better and closer co-operative working basis between the various companies and the association.

PUBLICITY

It was also decided by the board that the association would continue to carry in Sweet's Catalog four pages of copy similar to the four pages which appeared in the 1916 issue of this publication. Sweet's Catalog is considered by the architects as one of their best references for building material and construction, and it is believed that the carrying of these four pages of copy will gradually be the means of bringing to the architects' attention facts that they should be familiar with when considering the construction of buildings and the use of gas service.

It was decided that all exhibitors at future conventions must carry company membership in the association and must also be members of the Manufacturers' Section of the N. C. G. A., and further that the literature of the various exhibiting companies must be unquestioned and contain no statements which are deemed by the advisory committee to the president to be incorrect or harmful.

An innovation this year will be the discontinuation of the general mid-year conference, such as has been held for the past two years in New York City. In place of this it is the intention of the board of directors to invite the chairmen and members of the various committees to meet with the board of directors in Chicago during the month of March, and in New York during the month of April. The purpose of this conference is clearly to define the work of the various committees, and to interest their members and their chairmen in the particular work assigned to them, and at the same time to allow this work to be undertaken early in the year so that there will be sufficient time during the year to consummate their plans and carry them on to a successful conclusion.

The board of directors officially accepted a donation of $1,000 which had been made to the educational work by the Manufacturers' Section of the N. C. G. A. and expressed their appreciation of the loyal support of the Manufacturers' Section for this expression of its co-operation.

The secretary was authorized to communicate with the members of the association to learn whether the members generally found enough value or took enough interest in the Annual Proceedings of the association to desire to receive this volume in the future, and members are requested to communicate with the headquarters office advising the secretary whether the proceedings are of sufficient interest to them to have the association go to the expense of publishing and distributing them.

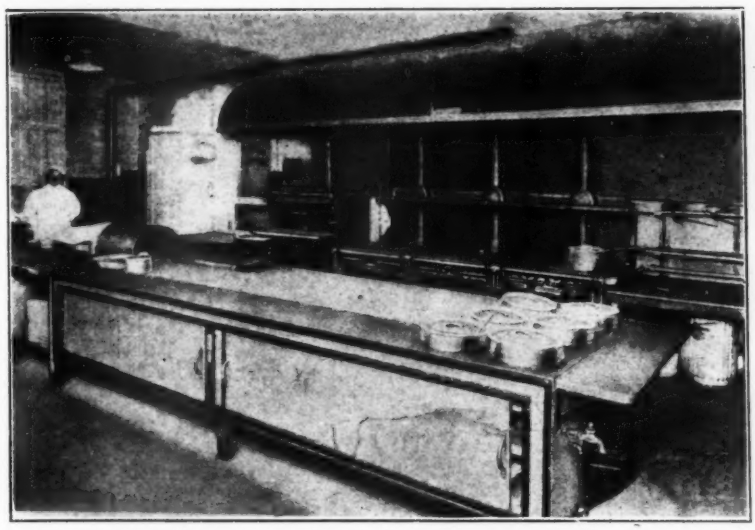
The various committees of the association and their chairmen were thoroughly discussed, and committee appointments definitely made.

New Company Formed at Huntington, W. Va.

The Keystone Gas Company will locate in Huntington, W. Va., with an authorized capital stock of $50,000 and the following incorporators: John H. Holt, H. G. Dimick, Jr., T. E. Dimick, W. E. Deegans, G. S. Miller and H. C. Duncan, Jr., all of Huntington.

All-Gas Club Kitchen in Rochester, N. Y.

The above up-to-date complete gas kitchen equipment was installed at the Rochester Club on Oct. 18, by the Rochester Railway & Light Company, Rochester, N. Y. The equipment consists of three sections of Garland Hotel Ranges, 1 Rex Ray Surface Combustion Broiler, 1 Vulcan Bake Oven, 1 40-gallon Stock Kettle, 1 Vegetable Steamer, 1 Battery of Coffee Urns with urn stand and cup warmer below, 2 Plate Warmers, 1 stove used by pastry cook, together with gas burner apparatus under dish-washing machine.



COMPLETE GAS EQUIPMENT IN ROCHESTER CLUB

The gas consumed for the past two months totaled 484,000 cu. ft., costing about $160 a month. The club management and chef are very much pleased with the superiority of the gas equipment over the use of coal.

War Profits May Help Solve Chicago Rates

Establishment of a gas rate of 70 cents per thousand cubic feet with a quarterly division among consumers of two-thirds of the profits obtained from the People's Gas Light & Coke Company's project for washing benzol and other munitions material from gas was recommended to the council committee on gas, oil and electric light by Edward W. Bemis, the committee's special expert.

Mr. Bemis estimated that the company's profits for 1917 from the sale of war by-products will be in excess of $800,000. This would represent a further reduction through the profit-sharing plan of 3 to 4 cents per thousand cubic feet.

He recommended the establishment of a heating standard of 565 British thermal units and a light standard of 9 candlepower for the 70-cent gas. The company now charges 80 cents for gas, the city's quality requirement being 600 B. t. u. and 22 candlepower.

The price provision of the ordinance recommended to the committee is as follows:

Price—The price of gas shall be seventy (70) cents net per thousand feet; that is, seventy-five (75) cents, less five (5) cents for prompt payment, and with a minimum monthly bill of twenty-five (25) cents for three-light and five-light meters, with higher minimum for larger meters, the higher minimums to be fixed in the ordinance. At any succeeding monthly payment, made within approximately sixty (60) days after the payment of such minimum bill, any excess in the bill above the minimum shall be applied to the repayment of such money as was previously paid within the said sixty (60) days on account of such minimum.

For gas in excess of 10,000 feet a month the company may charge the net operating cost in the holder, plus twenty (20) cents to cover interest on the investment, the cost of distribution, and a profit that will enable gas to be sold ultimately at a lower price than otherwise to the small consumer.

Brooklyn Company Insures Employees

The Brooklyn Union Gas Company, the Newton Gas Company, the Flatbush Gas Company, the Jamaica Gas Light Company, the Woodhaven Gas Light Company and the Richmond Hill and Queens County Gas Light Company have insured their employees under the group plan of the Equitable Life Assurance Society. This means that about 4,000 families will receive the protection of $3,500,000 of life insurance.

Springfield, Mass., Shows Big Increase in Customers

The Springfield (Mass.) Gas Light Company recently passed the 40,000 mark in the number of its customers.

Providence Company Calls Debenture Issue In

The directors of the Providence Gas Company, at a meeting held recently, arranged for the immediate redemption of the convertible debentures of the company.

The 28,000 shares of the debentures outstanding have an aggregate par value of $1,400,000, and were issued July 1, 1915. The company was obligated to redeem the debentures on July 1, 1918, but as the purpose for which the debentures were issued have been accomplished, it has been decided to redeem them at this time.

Holders of debentures are invited to present their certificates at the office of the treasurer of the company, 706 Turks Head Building, before March 20, 1917, for exchange for certificates of capital stock of the company. Stock received in exchange for the debentures before March 20, 1917, will participate in all dividends paid on and after April 1, 1917.

Western States Gas Sells Notes

The Western States Gas & Electric Company, a subsidiary of the Standard Gas & Electric Company, has sold to H. M. Byllesby & Company and William P. Bonbright & Company, $1,564,000 ten-year 6 per cent. notes. The notes are part of a new issue approval of which has been asked from the California Railroad Commission, and the proceeds will go to pay floating debt and for extensions and additions to properties.

Dinner and Dance of Brockton, (Mass.) Company

With dinner, entertainment and dance, members of the Brockton Gas Light Company Employees' Association held their first ladies' night in Knights of Columbus rooms recently. The affair was one of the most successful events held by the association, and a similar event will be held each year.

Two halls were used in entertaining the ladies. The dinner was served in the front hall during which the entertainment took place. Following this dancing was enjoyed until midnight in the spacious lodge room.

The dinner was served at 8 o'clock. No expense was spared and the menu left nothing to be desired. It included a full course turkey dinner.

William P. Morton, president of the association, gave an address of welcome. The regular meeting was to have been held in connection with the affair, but at the suggestion of President Morton it was voted to pass it. President Morton then introduced chairman of the committee of arrangements Wilfred A. Jodoin as toastmaster.

Chairman Jodoin made an excellent toastmaster, for with witty sallies and a fine selection of numbers he kept things lively from start to finish. General Manager George H. Priest was called on to speak and extended his greetings to the association and its guests, complimenting the members on the success of the occasion. He stated it is his firm belief a man should never have to work so hard he cannot find time for enjoyment. Mr. Priest urged more of such occasions be held. Assistant Manager J. B. Anderson also spoke briefly along the same lines.

Impersonations, character songs and musical selections followed by dancing made the affair highly successful.

Program of Annual Meeting of New England Association of Gas Engineers

The forty-seventh annual meeting of the New England Association of Gas Engineers will be held on Wednesday and Thursday, Feb. 14-15, at the Copley-Plaza, Boston.

The following papers are to be discussed:

"House Heating by Gas in Portland, Me.," A. G. Spinney.

"Some of the New Materials Used for Oxide Purification," A. H. Scott.

"Gas Lighting," J. C. D. Clark.

"Some Gas Coals We Have Used," F. E. Drake.

"New Coal Gas Plant at Newport," J. K. Quinn.

Question Box.

"How much will a relief holder increase the efficiency of a water gas set?"

"What results are given by outside steel purifiers in cold climates? Cost of heating, etc.?"

"What, if any, economies have been shown by operating gas plants on a heat unit basis?"

And any other questions members may present.

The Copley-Plaza is near the Back Bay and Huntington Avenue railroad stations, and not far from the business and shopping districts.

Room rates: Single with bath, $3.50 and up; double with bath, $5 and up.

There are other hotels nearby and the downtown hotels are only a few minutes distant.

Members having names to propose for membership should send them to the secretary before Feb. 13.

The annual dinner will be held Wednesday evening at the Copley-Plaza. As a guarantee is required members are requested to notify the secretary in *advance* how many tickets they will require.

Friends of the association are welcome to attend the meeting and take part in the discussions. W. W. Gifford is secretary of the association.

Montevideo, Minn., May Have Gas Plant

At the coming City Election in Montevideo, Minn., the proposition of granting a franchise to the Public Improvement Company of Minneapolis, to establish and operate a gas plant in Montevideo, will be submitted to a vote.

John Joyce Dead

John Joyce, president and director of several lighting properties in Massachusetts, and largely interested in a number of industrial enterprises, died at his winter home in California, Jan. 26, at the age of 68. He was a conspicuous example of a "self-made" man, being an immigrant to this country from Ireland at an early age. He entered business as a clerk and in 1877 formed a business partnership with M. J. Curran. He organized the Shawinigan Water & Power Company of Canada and later invested in the Gillette Safety Razor Company, and became a director and vice-president. Later he entered the field of public utilities and became president of the Dedham & Hyde Park Gas & Electric, Attleboro Steam & Electric Company, West Boston Gas Company, Framingham Gas, Fuel & Power Company and Natick Gas Light Company. He was president and director of the Lake Superior Iron & Chemical Company and a director of the Massachusetts Bonding & Insurance Company, National Shawmut Bank and Puritan Trust Company, Boston. Mr. Joyce was a member of the Knights of Columbus and the Elks. The widow and two daughters survive. The funeral was held in California, and burial will be at Andover, Mass., in the spring. He had made his summer home at Andover for several years past.

Industrial Show in Pennyslvania

Plans are in preparation for an industrial show in Easton, Pa., in April, 1917, at which it is expected every industry in the city will be represented.

Societies and Associations

The PHILADELPHIA G. W. SECTION of the N. C. G. A. held its regular meeting in Scottish Rites Hall on Jan. 16, with about 800 members present. The meeting was opened by an overture played by the U. G. I. band, and the singing of "America" by all the members. After the reading of the minutes, a debate was held on the following question: "Resolved, that the periodic reduction for a limited time in the selling price on standard appliances redounds to the best interest of our company." The judges, T. R. Elcock, Jr., W. J. Serrill, T. H. Jackson, decided in favor of the affirmative. M. Gibbons Neff, chairman of the debating committee, was in the chair during the debate. This was followed by the presentation of the Lewis Lillie Efficiency Cup, presented by Mr. Lillie, 3rd vice-president of the United Gas Improvement Company, to the Spring Garden district for the greatest increase in sundry sales for the year 1916. C. Willing Hare presented a gold medal to E. Baker of City District for the highest number of points for the year 1916; and a gold medal to M. J. Ward, City District, for the greatest increase in business for 1916 over 1915. The meeting adjourned at 10 p. m.

The SOUTHWESTERN ELECTRIC & GAS ASSOCIATION will hold its third annual convention in Dallas, Texas, April 26 to 28. Five hundred members of the Association are expected to attend.

The AMERICAN ASSOCIATION OF ENGINEERS will hold a national promotional convention under the slogan of "for the good of the engineer," Feb. 8, at the LaSalle Hotel, Chicago. This association embraces all varieties of technical, civil, electrical, mechanical, chemical and mining engineers and conducts an employment bureau which serves its members without charge and publishes the monthly organ, *The Monad*.

THE SOCIETY OF GAS ENGINEERING of New York City held its 97th regular monthly meeting in the Auditorium of the Consolidated Gas Company, 130 East Fifteenth Street, New York City, on Thursday afternoon, Jan. 25, 1917, with 100 in attendance. C. J. Ramsburg, vice-president of the H. Koppers Company of Pittsburgh, delivered a most interesting lecture on the Koppers type of By-Product Coke Oven, in which he described various details of design and also illustrated with moving pictures one of their plants in actual operation. He preceded the moving pictures with numerous lantern slides of various pieces of apparatus employed in the Koppers Oven Process. A long discussion followed his lecture, in the course of which were brought out many advantages of this process over the ordinary methods of manufacture. During the dinner which was served in the Restaurant of the Consolidated Gas Company, an interesting musical program was rendered.

The WATERBURY GAS LIGHT COMPANY held its annual meeting recently, which brought out the re-election of the directors as follows: E. G. Buckland, H. S. Chase, J. P. Elton, E. O. Goss, R. F. Griggs, O. S. Northrop, Harris Whittemore, Eli Whitney and E. H. Williams. The officers of the firm were later re-elected as follows: President, R. F. Griggs; Vice-President and Treasurer, E. H. Williams.

The ST. ALBANS GAS LIGHT COMPANY held the annual meeting of the stockholders at the offices of the company in St. Albans, Vt., recently. The following directors were elected at this meeting: S. R. Dunbar, of Anderson, Ind., W. H. Mills, of Boston, Mass., Oliver Stevens, of Lowell, Mass., Lee S. Tillotson and George S. Butler of St. Albans, Vt. The directors will later elect the officers for the coming year.

The OLD COLONY GAS COMPANY will hold an all-day convention Feb. 12 for its employees. Various papers of manufacture and distribution of gas will be read by both employees and manufacturers. An entertainment is to be given in the evening. Many of the large manufacturers of gas appliances will be present at this convention. A great deal of interest is being taken this winter in the educational work of this company. The employees are responding readily and classes are being held several nights a week. Their men are putting their time in at the expense of the company to study and give the consumers a better service. The department heads of the Old Colony Gas Company held their second monthly meeting Friday evening, Jan. 12. D. F. Condrick, chairman of the meeting, spoke to those present, expressing his pleasure at seeing such a large number. C. D. Bond gave a talk on the "Value of Education," which he stated should be most valuable to a company's employees. Everyone joined in a discussion of Mr. Bond's talk, and gave several instances wherein education proved most valuable. A reading entitled "My Creed," was given by T. T. McCarthy. During the evening piano, violin and vocal solos were greatly enjoyed. A number of employees took part in dancing which followed.

Personal Notes

R. H. BEAUMONT COMPANY of Philadelphia, builders of coal, coke and ashes handling machinery, skip hoists, etc., announce the opening of a New York office in the Hudson Terminal Building, 50 Church Street. The office will be in charge of William P. Alexander, who has been associated with the company for a number of years in the capacity of field superintendent, assistant chief engineer and sales engineer.

BYRON T. BURT, retiring general manager of the Rutland (Vt.) Railway, Light & Power Company, was recently presented with gold cuff links and a diamond and pearl stickpin, by members of the company force, in token of their esteem. James O'Brien, who recently resigned as auditor of the company, was the recipient of a like token from his office force. Both gifts came as a pleasant surprise from their fellows, with whom their relations have been most cordial.

J. F. MCLAUGHLIN, for four years private secretary to A. F. Townsend, manager of the Blackstone Valley Gas & Electric Company, Woonsocket (R. I.) office, will shortly leave for Beaumont, Texas, and will assume similar duties for Mr. Townsend, who is manager of the Lighting & Traction Company there.

HARRY R. SWANN, for 54 years an employee of the Old Louisville Gas Company, died at his home in Louisville, Jan. 20, 1917. He had been general inspector for many years up to the time of his retirement in June, 1915.

Construction Notes

New Gas Mains at Charlottesville, Va.

H. M. Hantzmon, the city superintendent of gas at Charlottesville, Va., reports that the temporary line across the new Southern Railroad bridge, West Main Street, has interfered with the gas supply west of that point, but that this condition will be improved in the near future. A six-inch gas main is to be laid over the new bridge to take the place of the four-inch main that was across the old one.

Plans are also on foot to run a four-inch line from Seven and One-half Street on Nalle Street to Ninth Street; another four-inch main from Seventh Street south to Dice Street; and a six-inch line on Preston Avenue west from Via's Crossing to Eighth Street with side connections, as this street is to be macadamized in the near future.

Contract Awarded by Consolidated Company

The George A. Fuller Company has been awarded the contract to erect a six story office building for the Consolidated Gas Company at Nos. 212 to 216 West 57th Street, New York City, a site occupied until recently by the Central Presbyterian Church. The plot abuts the site of Joseph J. Lannin's proposed hotel and the Rodin Studios, now under construction.

Gas Company to Operate Salt Plant

In addition to the oil, gas and gasoline business, the Ohio Cities Gas Company to-day announced its purpose to manufacture salt. A half-million-dollar plant will be erected at the mouth of Cabin Creek, near the company's big oil pool in West Virginia.

Besides the profits to be obtained in the new venture, the company also will put to use from 5,000,000 to 10,000,000 cubic feet of natural gas, which it obtains from its field and from which it extracts gasoline by the compression method.

To have charge of its salt business the company has engaged P. L. Clifton, for years engaged in similar enterprises in the Pomeroy district. The market for salt, bromine and calcium magnesium chloride has been largely broadened during the last year or so, and that, too, on rising prices. New chemical plants in West Virginia, Virginia and Tennessee have been clamoring for these products, of which there is enormous consumption in the district east of the Mississippi and south of the Ohio River.

Production within the district has been only about 15 per cent. of the demand, and large supplies are drawn annually from Michigan, New York and Northern Ohio.

The Ohio Cities' territory is in the midst of what are said to be inexhaustible salt deposits, with permanently favorable fuel supply, and located so as to enjoy freight rates comparatively lower than New York and Michigan, which now rank highest in production. Further, the company enjoys an advantage in that salt made from West Virginia brine is free from sulphate.

The proposed plant will handle in the neighborhood of 12,000 barrels of salt water daily, and it is expected to produce annually 36,000 tons of salt, 130,000 pounds of bromide and 7,000 tons of calcium magnesium chloride.

Contract for Panama Gas Plant

The Panama Gas Company has awarded a contract for the construction of its plant to F. H. Arosemena, of Panama City. Work was to begin Jan. 1, 1917, and to be completed in about eight months. The company is capitalized at $500,000, divided into 20,000 shares of a par value of $25 and is being financed by a Philadelphia firm.

The pipes to be used are of 12, 8 and 6 inch, down to house-connection size of about one inch, and these, as well as all other material required, are to be imported direct from the United States.

The contract given to Mr. Arosemena calls for the complete construction of the work in Panama and Colon, and also includes a perpetual contract for house connections and installations in both cities.

Factory Installs Auxiliary Gas Plant

The Essex Glass Company of Parkersburg, W. Va., is installing an artificial gas plant so that when natural gas is short it may continue operations.

Buys Land for New Gas Plant

The Counties Gas & Electric Company, whose offices are in Norristown, Pa., has bought a plot of ground on the Schuylkill River bank in Conshohocken, upon which it will build a modern 1000-horsepower plant for supplying gas to Conshohocken.

Indianapolis Company Files Petition for Improvements

Authority to issue and sell $250,000 of common stock, and $192,000 first mortgage 5 per cent. bonds, is asked in a petition filed with the public service commission by the Citizens Gas Company, of Indianapolis. The money obtained will be used, according to the petition, to replace money taken from the treasury to pay for extensions and improvements made in 1916, and to provide money for extensions and improvements contemplated for 1917. All the money would be used for the property owned by the company, as distinguished from that leased from the Indianapolis Gas Company.

It is estimated that $78,950 should be spent in 1917 in improving the manufacturing plant, $80,345 in extensions to the distributing system, and $44,950 in general improvements to the distributing system. The company wishes to spend $13,019.50 for automobiles.

The bond issue the company submits for approval will consist, if authority to issue it is given by the commission, of 5 per cent. mortgage bonds dated July 1, 1912, and maturing in thirty years, secured by a mortgage to the Bankers' Trust Company, of New York, and the Union Trust Company, of Indianapolis, trustees. The sale of escrow bonds by the company is limited, according to the petition, to 80 per cent. of the cost of any improvements made, and the remainder of the cost must be obtained by the sale of other securities.

City Line Will Supply 4-Cent Gas for Incinerator

The incinerating plant, owned and operated by Muskogee, Okla., near the north city limits, will use gas from the municipal gas pipe line in accordance with a suggestion of City Engineer H. H. White, which was adopted by the city council recently.

On one occasion the incinerating plant has been shut down because of the high cost of operation and lack of funds. The city has not been able to secure any reduction in rates on fuel used at the incinerator. When the city's line is opened the incinerator will be operated on 4-cent gas.

Engineer White also recommended that an engine be bought and installed at the incinerator by the city, so that the gas might be burnt under great pressure and thereby cut down the quantity necessary to cremate the bodies of dead animals. At present it requires two days and a half to burn a dead horse or mule, he said.

Brockton Company Extends to Canton

The Massachusetts Gas and Electric Light Commission has authorized the Brockton Gas Light Company to carry on business in the town of Canton, Mass. The company was organized in 1859 to do a gas lighting business in North Bridgewater, which later became the City of Brockton. In 1874 the name of the company was changed, with the change of municipality. Since then the company has extended its business to Avon, Randolph, Holbrook, Bridgewater, East and West Bridgewater, and Stoughton. Canton is contiguous to Randolph and Stoughton.